Appendix A

State Primacy Crosswalk of Requirements

State Primacy Crosswalk

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
GENERAL REQUIREMENTS			
PART 124--PROCEDURES FOR DECISION MAKING			
SUBPART A--GENERAL PROGRAM REQUIREMENTS			
40 CFR §124.10 Public notice of permit actions and public comment period.			
Methods (applicable to State programs, see 40 CFR 123.25 (NPDES), 145.11 (UIC), 233.23 (404), and 271.14 (RCRA)). Public notice of activities described in paragraph (a)(1) of this section shall be given by the following methods:	40 CFR §124.10(c)		
For Class VI injection well UIC permits, mailing or emailing a notice to State and local oil and gas regulatory agencies and State agencies regulating mineral exploration and recovery, the Director of the Public Water Supply Supervision program in the State, and all agencies that oversee injection wells in the State.	40 CFR §124.10(c)(1)(xi)		
PART 144--UNDERGROUND INJECTION CONTROL PROGRAM			
SUBPART A--GENERAL PROVISIONS			
40 CFR §144.1 Purpose and scope of Part 144.			
Subpart H of part 146 sets forth requirements for owners or operators of Class VI injection wells.	40 CFR §144.1(f)(1)(viii)		
Scope of the permit or rule requirement. The UIC permit program regulates underground injection by six classes of wells (see definition of ''well injection,'' §144.3). The six classes of wells are set forth in §144.6. All owners or operators of these injection wells must be authorized either by permit or rule by the Director. In carrying out the mandate of the SDWA, this subpart provides that no injection shall be authorized by permit or rule if it results in the movement of fluid containing any contaminant into underground sources of drinking water (USDWs –see §144.3 for definition), if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR part 141 or may adversely affect the health of persons (§144.12). Existing Class IV wells which inject hazardous waste directly into an underground source of drinking water are to be eliminated over a period of six	40 CFR §144.1(g)		

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months and new such Class IV wells are to be prohibited (§144.13). For Class V wells, if remedial action appears necessary, a permit may be required (§144.25) or the Director must require remedial action or closure by order (§144.6(c)). During UIC program development, the Director may identify aquifers and portions of aquifers which are actual or potential sources of drinking water. This will provide an aid to the Director in carrying out his or her duty to protect all USDWs. An aquifer is a USDW if it fits the definition under §144.3, even if it has not been "identified." The Director may also designate "exempted aquifers" using the criteria in 40 CFR 146.4 of this chapter. Such aquifers are those which would otherwise qualify as "underground sources of drinking water" to be protected, but which have no real potential to be used as drinking water sources. Therefore, they are not USDWs. No aquifer is an exempted aquifer until it has been affirmatively designated under the procedures at §144.7. Aquifers which do not fit the definition of "underground source of drinking water" are not "exempted aquifers." They are simply not subject to the special protection afforded USDWs. During initial Class VI program development, the Director shall not expand the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption for Class VI injection wells and EPA shall not approve a program that applies for aquifer exemption expansions of Class II-Class VI exemptions as part of the program description. All Class II to Class VI aquifer exemption expansions previously issued by EPA must be incorporated into the Class VI program descriptions pursuant to requirements at §145.23(f)(9).***			
40 CFR §144.3 Definitions.			
Geologic sequestration means the long-term containment of a gaseous, liquid, or supercritical carbon dioxide stream in subsurface geologic formations. This term does not apply to carbon dioxide capture or transport.***	40 CFR §144.3		
40 CFR §144.6 Classification of wells.			
Class V. Injection wells not included in Class I, II, III, IV, or VI. Specific types of Class V injection wells are described in §144.81.	40 CFR §144.6(e)		

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Class VI. Wells that are not experimental in nature that are used for geologic sequestration of carbon dioxide beneath the lowermost formation containing a USDW; or, wells used for geologic sequestration of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at §146.95 of this chapter; or, wells used for geologic sequestration of carbon dioxide that have received an expansion to the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to §§146.4 of this chapter and 144.7(d).	40 CFR §144.6(f)		
40 CFR §144.7 Identification of underground sources of drinking water and exempted aquifers.			
The Director may identify (by narrative description, illustrations, maps, or other means) and shall protect as underground sources of drinking water, all aquifers and parts of aquifers which meet the definition of "underground source of drinking water" in §144.3, except to the extent there is an applicable aquifer exemption under paragraph (b) of this section or an expansion to the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption for the exclusive purpose of Class VI injection for geologic sequestration under paragraph (d) of this section. Other than EPA approved aquifer exemption expansions that meet the criteria set forth in §146.4(d) of this chapter, new aquifer exemptions shall not be issued for Class VI injection wells. Even if an aquifer has not been specifically identified by the Director, it is an underground source of drinking water if it meets the definition in §144.3.	40 CFR §144.7(a)		
The Director may identify (by narrative description, illustrations, maps, or other means) and describe in geographic and/or geometric terms (such as vertical and lateral limits and gradient) which are clear and definite, all aquifers or parts thereof which the Director proposes to designate as exempted aquifers using the criteria in §146.4 of this chapter.	40 CFR §144.7(b)(1)		

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No designation of an exempted aquifer submitted as part of a UIC program shall be final until approved by the Administrator as part of a UIC program. No designation of an expansion to the areal extent of a Class II enhanced oil recovery or enhanced gas recovery aquifer exemption for the exclusive purpose of Class VI injection for geologic sequestration shall be final until approved by the Administrator as a revision to the applicable Federal UIC program under part 147 or as a substantial revision of an approved State UIC program in accordance with §145.32 of this chapter. ***	40 CFR §144.7(b)(2)		
Expansion to the Areal Extent of Existing Class II Aquifer Exemptions for Class VI Wells. Owners or operators of Class II enhanced oil recovery or enhanced gas recovery wells may request that the Director approve an expansion to the areal extent of an aquifer exemption already in place for a Class II enhanced oil recovery or enhanced gas recovery well for the exclusive purpose of Class VI injection for geologic sequestration. Such requests must be treated as a revision to the applicable Federal UIC program under part 147 or as a substantial program revision to an approved State UIC program under §145.32 of this chapter and will not be final until approved by EPA.	40 CFR §144.7(d)		
The owner or operator of a Class II enhanced oil recovery or enhanced gas recovery well that requests an expansion of the areal extent of an existing aquifer exemption for the exclusive purpose of Class VI injection for geologic sequestration must define (by narrative description, illustrations, maps, or other means) and describe in geographic and/or geometric terms (such as vertical and lateral limits and gradient) that are clear and definite, all aquifers or parts thereof that are requested to be designated as exempted using the criteria in §146.4 of this chapter.	40 CFR §144.7(d)(1)		
In evaluating a request to expand the areal extent of an aquifer exemption of a Class II enhanced oil recovery or enhanced gas recovery well for the purpose of Class VI injection, the Director must determine that the request meets the criteria for exemptions in §146.4. In making the determination, the Director shall consider:	40 CFR §144.7(d)(2)		
Current and potential future use of the USDWs to be exempted as drinking water resources;	40 CFR §144.7(d)(2)(i)		

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The predicted extent of the injected carbon dioxide plume, and any mobilized fluids that may result in degradation of water quality, over the lifetime of the GS project, as informed by computational modeling performed pursuant to §146.84(c)(1), in order to ensure that the proposed injection operation will not at any time endanger USDWs including non-exempted portions of the injection formation;	40 CFR §144.7(d)(2)(ii)		
Whether the areal extent of the expanded aquifer exemption is of sufficient size to account for any possible revisions to the computational model during reevaluation of the area of review, pursuant to §146.84(e); and	40 CFR §144.7(d)(2)(iii)		
Any information submitted to support a waiver request made by the owner or operator under §146.95, if appropriate.	40 CFR §144.7(d)(2)(iv)		
40 CFR §144.8 Noncompliance and program reporting by the Director.			
All Class VI program reports shall be consistent with reporting requirements set forth in §146.91 of this chapter.	40 CFR §144.8(b)(2)(iii)		
SUBPART B--GENERAL PROGRAM REQUIREMENTS			
40 CFR §144.12 Prohibition of movement of fluid into underground sources of drinking water.			
For Class I, II, III, and VI wells, if any water quality monitoring of an underground source of drinking water indicates the movement of any contaminant into the underground source of drinking water, except as authorized under part 146, the Director shall prescribe such additional requirements for construction, corrective action, operation, monitoring, or reporting (including closure of the injection well) as are necessary to prevent such movement.***	40 CFR §144.12(b)		
40 CFR §144.15 Prohibition of non-experimental Class V wells for geologic sequestration.			
The construction, operation or maintenance of any non-experimental Class V geologic sequestration well is prohibited.	40 CFR §144.15		
40 CFR §144.18 Requirements for Class VI wells.			
Owners or operators of Class VI wells must obtain a permit. Class VI wells cannot be authorized by rule to inject carbon dioxide.	40 CFR §144.18		
40 CFR §144.19 Transitioning from Class II to Class VI.			

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
Owners or operators that are injecting carbon dioxide for the primary purpose of long- term storage into an oil and gas reservoir must apply for and obtain a Class VI geologic sequestration permit when there is an increased risk to USDWs compared to Class II operations. In determining if there is an increased risk to USDWs, the owner or operator must consider the factors specified in §144.19(b).	40 CFR §144.19(a)		
The Director shall determine when there is an increased risk to USDWs compared to Class II operations and a Class VI permit is required. In order to make this determination the Director must consider the following:	40 CFR §144.19(b)		
Increase in reservoir pressure within the injection zone(s);	40 CFR §144.19(b)(1)		
Increase in carbon dioxide injection rates;	40 CFR §144.19(b)(2)		
Decrease in reservoir production rates;	40 CFR §144.19(b)(3)		
Distance between the injection zone(s) and USDWs;	40 CFR §144.19(b)(4)		
Suitability of the Class II area of review delineation;	40 CFR §144.19(b)(5)		
Quality of abandoned well plugs within the area of review;	40 CFR §144.19(b)(6)		
The owner's or operator's plan for recovery of carbon dioxide at the cessation of injection;	40 CFR §144.19(b)(7)		
The source and properties of injected carbon dioxide; and	40 CFR §144.19(b)(8)		
Any additional site-specific factors as determined by the Director.	40 CFR §144.19(b)(9)		
SUBPART C--AUTHORIZATION OF UNDERGROUND INJECTION BY RULE			
40 CFR §144.22 Existing Class II enhanced recovery and hydrocarbon storage wells.			
Duration of well authorization by rule. Well authorization under this section expires upon the effective date of a permit issued pursuant to §§144.19, 144.25, 144.31, 144.33 or 144.34; after plugging and abandonment in accordance with an approved plugging and abandonment plan pursuant to §§144.28(c) and 146.10 of this chapter; and upon submission of a plugging and abandonment report pursuant to §144.28(k); or upon conversion in compliance with §144.28(j).	40 CFR §144.22(b)		

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SUBPART D--AUTHORIZATION BY PERMIT			
40 CFR §144.31 Application for a permit; authorization by permit.			
Information requirements. All applicants for Class I, II, III, and V permits shall provide the following information to the Director, using the application form provided by the Director. Applicants for Class VI permits shall follow the criteria provided in §146.82 of this chapter.	40 CFR §144.31(e)		
40 CFR §144.33 Area permits.			
Used to inject other than hazardous waste; and	40 CFR §144.33(a)(4)		
Other than Class VI wells.	40 CFR §144.33(a)(5)		
40 CFR §144.36 Duration of permits.			
Permits for Class I and V wells shall be effective for a fixed term not to exceed 10 years. UIC permits for Class II and III wells shall be issued for a period up to the operating life of the facility. UIC permits for Class VI wells shall be issued for the operating life of the facility and the post-injection site care period. The Director shall review each issued Class II, III, and VI well UIC permit at least once every 5 years to determine whether it should be modified, revoked and reissued, terminated or a minor modification made as provided in §§144.39, 144.40, or 144.41.	40 CFR §144.36(a)		
40 CFR §144.38 Transfer of permits.			
Automatic transfers. As an alternative to transfers under paragraph (a) of this section, any UIC permit for a well not injecting hazardous waste or injecting carbon dioxide for geologic sequestration may be automatically transferred to a new permittee if:	40 CFR §144.38(b)		
40 CFR §144.39 Modification or revocation and reissuance of permits.			
******* For Class I hazardous waste injection wells, Class II, Class III or Class VI wells the following may be causes for revocation and reissuance as well as modification; and for all other wells the following may be cause for revocation or reissuance as well as modification when the permittee requests or agrees. *******	40 CFR §144.39(a)		

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******* Permits other than for Class I hazardous waste injection wells, Class II, Class III or Class VI wells may be modified during their permit terms for this cause only as follows: *******	40 CFR §144.39(a)(3)		
Basis for modification of Class VI permits. Additionally, for Class VI wells, whenever the Director determines that permit changes are necessary based on:	40 CFR §144.39(a)(5)		
Area of review reevaluations under §146.84(e)(1) of this chapter;	40 CFR §144.39(a)(5)(i)		
Any amendments to the testing and monitoring plan under §146.90(j) of this chapter;	40 CFR §144.39(a)(5)(ii)		
Any amendments to the injection well plugging plan under §146.92(c) of this chapter;	40 CFR §144.39(a)(5)(iii)		
Any amendments to the post-injection site care and site closure plan under §146.93(a)(3) of this chapter;	40 CFR §144.39(a)(5)(iv)		
Any amendments to the emergency and remedial response plan under §146.94(d) of this chapter; or	40 CFR §144.39(a)(5)(v)		
A review of monitoring and/or testing results conducted in accordance with permit requirements.	40 CFR §144.39(a)(5)(vi)		
40 CFR §144.41 Minor modifications of permits.			
Amend a Class VI injection well testing and monitoring plan, plugging plan, post-injection site care and site closure plan, or emergency and remedial response plan where the modifications merely clarify or correct the plan, as determined by the Director.	40 CFR §144.41(h)		
SUBPART E--PERMIT CONDITIONS			
40 CFR §144.51 Conditions applicable to all permits.			
Owners or operators of Class VI wells shall retain records as specified in subpart H of part 146, including §§146.84(g), 146.91(f), 146.92(d), 146.93(f), and 146.93(h) of this chapter.	40 CFR §144.51(j)(4)		

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A Class I, II or III permit shall include and a Class V permit may include conditions which meet the applicable requirements of §146.10 of this chapter to ensure that plugging and abandonment of the well will not allow the movement of fluids into or between USDWs. Where the plan meets the requirements of §146.10 of this chapter, the Director shall incorporate the plan into the permit as a permit condition. Where the Director's review of an application indicates that the permittee's plan is inadequate, the Director may require the applicant to revise the plan, prescribe conditions meeting the requirements of this paragraph, or deny the permit. A Class VI permit shall include conditions which meet the requirements set forth in §146.92 of this chapter. Where the plan meets the requirements of §146.92 of this chapter, the Director shall incorporate it into the permit as a permit condition. For purposes of this paragraph, temporary or intermittent cessation of injection operations is not abandonment.	40 CFR §144.51(o)		
The owner or operator of a Class I, II, III or VI well permitted under this part shall establish mechanical integrity prior to commencing injection or on a schedule determined by the Director. Thereafter the owner or operator of Class I, II, and III wells must maintain mechanical integrity as defined in §146.8 of this chapter and the owner or operator of Class VI wells must maintain mechanical integrity as defined in §146.89 of this chapter. ***	40 CFR §144.51(q)(1)		
When the Director determines that a Class I, II, III or VI well lacks mechanical integrity pursuant to §§146.8 or 146.89 of this chapter for Class VI of this chapter, he/she shall give written notice of his/her determination to the owner or operator. ***	40 CFR §144.51(q)(2)		

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40 CFR §144.52 Establishing permit conditions.			
In addition to conditions required in §144.51, the Director shall establish conditions, as required on a case-by-case basis under §144.36 (duration of permits), §144.53(a) (schedules of compliance), §144.54 (monitoring), and for EPA permits only §144.53(b) (alternate schedules of compliance), and §144.4 (considerations under Federal law). Permits for owners or operators of hazardous waste injection wells shall include conditions meeting the requirements of §144.14 (requirements for wells injecting hazardous waste), paragraphs (a)(7) and (a)(9) of this section, and subpart G of part 146. Permits for owners or operators of Class VI injection wells shall include conditions meeting the requirements of subpart H of part 146. Permits for other wells shall contain the following requirements, when applicable.	40 CFR §144.52(a)		
Corrective action as set forth in §§144.55, 146.7, and 146.84 of this chapter.	40 CFR §144.52(a)(2)		
The well has been plugged and abandoned in accordance with an approved plugging and abandonment plan pursuant to §§144.51(o), 146.10, and 146.92 of this chapter, and submitted a plugging and abandonment report pursuant to §144.51(p); or	40 CFR §144.52(a)(7)(i)(A)		
The permittee shall show evidence of such financial responsibility to the Director by the submission of a surety bond, or other adequate assurance, such as a financial statement or other materials acceptable to the Director. For EPA administered programs, the Regional Administrator may on a periodic basis require the holder of a lifetime permit to submit an estimate of the resources needed to plug and abandon the well revised to reflect inflation of such costs, and a revised demonstration of financial responsibility, if necessary. The owner or operator of a well injecting hazardous waste must comply with the financial responsibility requirements of subpart F of this part. For Class VI wells, the permittee shall show evidence of such financial responsibility to the Director by the submission of a qualifying instrument (see §146.85(a) of this chapter), such as a financial statement or other materials acceptable to the Director. The owner or operator of a Class VI well must comply with the financial responsibility requirements set forth in §146.85 of this chapter.	40 CFR §144.52(a)(7)(ii)		

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Mechanical integrity. A permit for any Class I, II, III or VI well or injection project which lacks mechanical integrity shall include, and for any Class V well may include, a condition prohibiting injection operations until the permittee shows to the satisfaction of the Director under §§146.8, or 146.89 for Class VI, that the well has mechanical integrity.	40 CFR §144.52(a)(8)		
SUBPART G--REQUIREMENTS FOR OWNERS AND OPERATORS OF CLASS V INJECTION WELLS			
40 CFR §144.80 What is a Class V injection well?			
Class V. Injection wells not included in Class I, II, III, IV or VI. ***	40 CFR §144.80(e)		
Class VI. Wells used for geologic sequestration of carbon dioxide beneath the lowermost formation containing a USDW, except those wells that are experimental in nature; or, wells used for geologic sequestration of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at §146.95 of this chapter; or, wells used for geologic sequestration of carbon dioxide that have received an expansion to the areal extent of a existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to §§146.4 of this chapter and 144.7(d).	40 CFR §144.80(f)		
PART 146--UNDERGROUND INJECTION CONTROL PROGRAM: CRITERIA AND STANDARDS			
SUBPART A--GENERAL PROVISIONS			
40 CFR §146.4 Criteria for exempted aquifers.			
An aquifer or a portion thereof which meets the criteria for an "underground source of drinking water" in §146.3 may be determined under §144.7 of this chapter to be an "exempted aquifer" for Class I-V wells if it meets the criteria in paragraphs (a) through (c) of this section. Class VI wells must meet the criteria under paragraph (d) of this section:	40 CFR §146.4		
The areal extent of an aquifer exemption for a Class II enhanced oil recovery or enhanced gas recovery well may be expanded for the exclusive purpose of Class VI injection for geologic sequestration under §144.7(d) of this chapter if it meets the following criteria:	40 CFR §146.4(d)		
It does not currently serve as a source of drinking water; and	40 CFR §146.4(d)(1)		

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The total dissolved solids content of the ground water is more than 3,000 mg/l and less than 10,000 mg/l; and	40 CFR §146.4(d)(2)		
It is not reasonably expected to supply a public water system.	40 CFR §146.4(d)(3)		
40 CFR §146.5 Classification of injection wells.			
Class V. Injection wells not included in Class I, II, III, IV or VI. *******	40 CFR §146.5(e)		
Class VI. Wells that are not experimental in nature that are used for geologic sequestration of carbon dioxide beneath the lowermost formation containing a USDW; or, wells used for geologic sequestration of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at §146.95; or, wells used for geologic sequestration of carbon dioxide that have received an expansion to the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to §§146.4 of this chapter and 144.7(d).	40 CFR §146.5(f)		
SUBPART H--CRITERIA AND STANDARDS APPLICABLE TO CLASS VI WELLS			
40 CFR §146.81 Applicability.			
This subpart establishes criteria and standards for underground injection control programs to regulate any Class VI carbon dioxide geologic sequestration injection wells.	40 CFR §146.81(a)		
This subpart applies to any wells used to inject carbon dioxide specifically for the purpose of geologic sequestration, i.e., the long-term containment of a gaseous, liquid, or supercritical carbon dioxide stream in subsurface geologic formations.	40 CFR §146.81(b)		

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This subpart also applies to owners or operators of permit- or rule-authorized Class I, Class II, or Class V experimental carbon dioxide injection projects who seek to apply for a Class VI geologic sequestration permit for their well or wells. Owners or operators seeking to convert existing Class I, Class II, or Class V experimental wells to Class VI geologic sequestration wells must demonstrate to the Director that the wells were engineered and constructed to meet the requirements at §146.86(a) and ensure protection of USDWs, in lieu of requirements at §§146.86(b) and 146.87(a). By [INSERT DATE 365 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER], owners or operators of either Class I wells previously permitted for the purpose of geologic sequestration or Class V experimental technology wells no longer being used for experimental purposes that will continue injection of carbon dioxide for the purpose of GS must apply for a Class VI permit. A converted well must still meet all other requirements under part 146.	40 CFR §146.81(c)		
Definitions. The following definitions apply to this subpart. To the extent that these definitions conflict with those in §§144.3 or 146.3 of this chapter these definitions govern for Class VI wells: *area of review, carbon dioxide plume, carbon dioxide stream, confining zone, corrective action, geologic sequestration, geologic sequestration project, injection zone, post-injection site care, pressure front, site closure, transmissive fault or fracture.*	40 CFR §146.81(d)		
40 CFR §146.82 Required Class VI permit information.			
This section sets forth the information which must be considered by the Director in authorizing Class VI wells. For converted Class I, Class II, or Class V experimental wells, certain maps, cross-sections, tabulations of wells within the area of review and other data may be included in the application by reference provided they are current, readily available to the Director, and sufficiently identified to be retrieved. In cases where EPA issues the permit, all the information in this section must be submitted to the Regional Administrator.	40 CFR §146.82		

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Prior to the issuance of a permit for the construction of a new Class VI well or the conversion of an existing Class I, Class II, or Class V well to a Class VI well, the owner or operator shall submit, pursuant to §146.91(e), and the Director shall consider the following:	40 CFR §146.82(a)		
Information required in §144.31 (e)(1) through (6) of this chapter;	40 CFR §146.82(a)(1)		
A map showing the injection well for which a permit is sought and the applicable area of review consistent with §146.84. Within the area of review, the map must show the number or name, and location of all injection wells, producing wells, abandoned wells, plugged wells or dry holes, deep stratigraphic boreholes, State- or EPA-approved subsurface cleanup sites, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells, other pertinent surface features including structures intended for human occupancy, State, Tribal, and Territory boundaries, and roads. The map should also show faults, if known or suspected. Only information of public record is required to be included on this map;	40 CFR §146.82(a)(2)		
Information on the geologic structure and hydrogeologic properties of the proposed storage site and overlying formations, including:	40 CFR §146.82(a)(3)		
Maps and cross sections of the area of review;	40 CFR §146.82(a)(3)(i)		
The location, orientation, and properties of known or suspected faults and fractures that may transect the confining zone(s) in the area of review and a determination that they would not interfere with containment;	40 CFR §146.82(a)(3)(ii)		
Data on the depth, areal extent, thickness, mineralogy, porosity, permeability, and capillary pressure of the injection and confining zone(s); including geology/facies changes based on field data which may include geologic cores, outcrop data, seismic surveys, well logs, and names and lithologic descriptions;	40 CFR §146.82(a)(3)(iii)		
Geomechanical information on fractures, stress, ductility, rock strength, and in situ fluid pressures within the confining zone(s);	40 CFR §146.82(a)(3)(iv)		
Information on the seismic history including the presence and depth of seismic sources and a determination that the seismicity would not interfere with containment; and	40 CFR §146.82(a)(3)(v)		

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Geologic and topographic maps and cross sections illustrating regional geology, hydrogeology, and the geologic structure of the local area.	40 CFR §146.82(a)(3)(vi)		
A tabulation of all wells within the area of review which penetrate the injection or confining zone(s). Such data must include a description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Director may require;	40 CFR §146.82(a)(4)		
Maps and stratigraphic cross sections indicating the general vertical and lateral limits of all USDWs, water wells and springs within the area of review, their positions relative to the injection zone(s), and the direction of water movement, where known;	40 CFR §146.82(a)(5)		
Baseline geochemical data on subsurface formations, including all USDWs in the area of review;	40 CFR §146.82(a)(6)		
Proposed operating data for the proposed geologic sequestration site:	40 CFR §146.82(a)(7)		
Average and maximum daily rate and volume and/or mass and total anticipated volume and/or mass of the carbon dioxide stream;	40 CFR §146.82(a)(7)(i)		
Average and maximum injection pressure;	40 CFR §146.82(a)(7)(ii)		
The source(s) of the carbon dioxide stream; and	40 CFR §146.82(a)(7)(iii)		
An analysis of the chemical and physical characteristics of the carbon dioxide stream.	40 CFR §146.82(a)(7)(iv)		
Proposed pre-operational formation testing program to obtain an analysis of the chemical and physical characteristics of the injection zone(s) and confining zone(s) and that meets the requirements at §146.87;	40 CFR §146.82(a)(8)		
Proposed stimulation program, a description of stimulation fluids to be used and a determination that stimulation will not interfere with containment;	40 CFR §146.82(a)(9)		
Proposed procedure to outline steps necessary to conduct injection operation;	40 CFR §146.82(a)(10)		
Schematics or other appropriate drawings of the surface and subsurface construction details of the well;	40 CFR §146.82(a)(11)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
Injection well construction procedures that meet the requirements of §146.86;	40 CFR §146.82(a)(12)		
Proposed area of review and corrective action plan that meets the requirements under §146.84;	40 CFR §146.82(a)(13)		
A demonstration, satisfactory to the Director, that the applicant has met the financial responsibility requirements under §146.85;	40 CFR §146.82(a)(14)		
Proposed testing and monitoring plan required by §146.90;	40 CFR §146.82(a)(15)		
Proposed injection well plugging plan required by §146.92(b);	40 CFR §146.82(a)(16)		
Proposed post-injection site care and site closure plan required by §146.93(a);	40 CFR §146.82(a)(17)		
At the Director's discretion, a demonstration of an alternative post-injection site care timeframe required by §146.93(c);	40 CFR §146.82(a)(18)		
Proposed emergency and remedial response plan required by §146.94(a);	40 CFR §146.82(a)(19)		
A list of contacts, submitted to the Director, for those States, Tribes, and Territories identified to be within the area of review of the Class VI project based on information provided in paragraph (a)(2) of this section; and	40 CFR §146.82(a)(20)		
Any other information requested by the Director.	40 CFR §146.82(a)(21)		
The Director shall notify, in writing, any States, Tribes, or Territories within the area of review of the Class VI project based on information provided in paragraphs (a)(2) and (a)(20) of this section of the permit application and pursuant to the requirements at §145.23(f)(13) of this chapter.	40 CFR §146.82(b)		
Prior to granting approval for the operation of a Class VI well, the Director shall consider the following information:	40 CFR §146.82(c)		
The final area of review based on modeling, using data obtained during logging and testing of the well and the formation as required by paragraphs (c)(2), (3), (4), (6), (7), and (10) of this section;	40 CFR §146.82(c)(1)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
Any relevant updates, based on data obtained during logging and testing of the well and the formation as required by paragraphs (c)(3), (4), (6), (7), and (10) of this section, to the information on the geologic structure and hydrogeologic properties of the proposed storage site and overlying formations, submitted to satisfy the requirements of paragraph (a)(3) of this section;	40 CFR §146.82(c)(2)		
Information on the compatibility of the carbon dioxide stream with fluids in the injection zone(s) and minerals in both the injection and the confining zone(s), based on the results of the formation testing program, and with the materials used to construct the well;	40 CFR §146.82(c)(3)		
The results of the formation testing program required at paragraph (a)(8) of this section;	40 CFR §146.82(c)(4)		
Final injection well construction procedures that meet the requirements of §146.86;	40 CFR §146.82(c)(5)		
The status of corrective action on wells in the area of review;	40 CFR §146.82(c)(6)		
All available logging and testing program data on the well required by §146.87;	40 CFR §146.82(c)(7)		
A demonstration of mechanical integrity pursuant to §146.89;	40 CFR §146.82(c)(8)		
Any updates to the proposed area of review and corrective action plan, testing and monitoring plan, injection well plugging plan, post-injection site care and site closure plan, or the emergency and remedial response plan submitted under paragraph (a) of this section, which are necessary to address new information collected during logging and testing of the well and the formation as required by all paragraphs of this section, and any updates to the alternative post-injection site care timeframe demonstration submitted under paragraph (a) of this section, which are necessary to address new information collected during the logging and testing of the well and the formation as required by all paragraphs of this section; and	40 CFR §146.82(c)(9)		
Any other information requested by the Director.	40 CFR §146.82(c)(10)		
Owners or operators seeking a waiver of the requirement to inject below the lowermost USDW must also refer to §146.95 and submit a supplemental report, as required at §146.95(a). The supplemental report is not part of the permit application.	40 CFR §146.82(d)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
40 CFR §146.83 Minimum criteria for siting.			
Owners or operators of Class VI wells must demonstrate to the satisfaction of the Director that the wells will be sited in areas with a suitable geologic system. The owners or operators must demonstrate that the geologic system comprises:	40 CFR §146.83(a)		
An injection zone(s) of sufficient areal extent, thickness, porosity, and permeability to receive the total anticipated volume of the carbon dioxide stream;	40 CFR §146.83(a)(1)		
Confining zone(s) free of transmissive faults or fractures and of sufficient areal extent and integrity to contain the injected carbon dioxide stream and displaced formation fluids and allow injection at proposed maximum pressures and volumes without initiating or propagating fractures in the confining zone(s).	40 CFR §146.83(a)(2)		
The Director may require owners or operators of Class VI wells to identify and characterize additional zones that will impede vertical fluid movement, are free of faults and fractures that may interfere with containment, allow for pressure dissipation, and provide additional opportunities for monitoring, mitigation, and remediation.	40 CFR §146.83(b)		
40 CFR §146.84 Area of review and corrective action.			
The area of review is the region surrounding the geologic sequestration project where USDWs may be endangered by the injection activity. The area of review is delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream and is based on available site characterization, monitoring, and operational data.	40 CFR §146.84(a)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
The owner or operator of a Class VI well must prepare, maintain, and comply with a plan to delineate the area of review for a proposed geologic sequestration project, periodically reevaluate the delineation, and perform corrective action that meets the requirements of this section and is acceptable to the Director. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit. As a part of the permit application for approval by the Director, the owner or operator must submit an area of review and corrective action plan that includes the following information:	40 CFR §146.84(b)		
The method for delineating the area of review that meets the requirements of paragraph (c) of this section, including the model to be used, assumptions that will be made, and the site characterization data on which the model will be based;	40 CFR §146.84(b)(1)		
A description of:	40 CFR §146.84(b)(2)		
The minimum fixed frequency, not to exceed five years, at which the owner or operator proposes to reevaluate the area of review;	40 CFR §146.84(b)(2)(i)		
The monitoring and operational conditions that would warrant a reevaluation of the area of review prior to the next scheduled reevaluation as determined by the minimum fixed frequency established in paragraph (b)(2)(i) of this section.	40 CFR §146.84(b)(2)(ii)		
How monitoring and operational data (e.g., injection rate and pressure) will be used to inform an area of review reevaluation; and	40 CFR §146.84(b)(2)(iii)		
How corrective action will be conducted to meet the requirements of paragraph (d) of this section, including what corrective action will be performed prior to injection and what, if any, portions of the area of review will have corrective action addressed on a phased basis and how the phasing will be determined; how corrective action will be adjusted if there are changes in the area of review; and how site access will be guaranteed for future corrective action.	40 CFR §146.84(b)(2)(iv)		
Owners or operators of Class VI wells must perform the following actions to delineate the area of review and identify all wells that require corrective action:	40 CFR §146.84(c)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
Predict, using existing site characterization, monitoring and operational data, and computational modeling, the projected lateral and vertical migration of the carbon dioxide plume and formation fluids in the subsurface from the commencement of injection activities until the plume movement ceases, until pressure differentials sufficient to cause the movement of injected fluids or formation fluids into a USDW are no longer present, or until the end of a fixed time period as determined by the Director. The model must:	40 CFR §146.84(c)(1)		
Be based on detailed geologic data collected to characterize the injection zone(s), confining zone(s) and any additional zones; and anticipated operating data, including injection pressures, rates, and total volumes over the proposed life of the geologic sequestration project;	40 CFR §146.84(c)(1)(i)		
Take into account any geologic heterogeneities, other discontinuities, data quality, and their possible impact on model predictions; and	40 CFR §146.84(c)(1)(ii)		
Consider potential migration through faults, fractures, and artificial penetrations.	40 CFR §146.84(c)(1)(iii)		
Using methods approved by the Director, identify all penetrations, including active and abandoned wells and underground mines, in the area of review that may penetrate the confining zone(s). Provide a description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Director may require; and	40 CFR §146.84(c)(2)		
Determine which abandoned wells in the area of review have been plugged in a manner that prevents the movement of carbon dioxide or other fluids that may endanger USDWs, including use of materials compatible with the carbon dioxide stream.	40 CFR §146.84(c)(3)		
Owners or operators of Class VI wells must perform corrective action on all wells in the area of review that are determined to need corrective action, using methods designed to prevent the movement of fluid into or between USDWs, including use of materials compatible with the carbon dioxide stream, where appropriate.	40 CFR §146.84(d)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
At the minimum fixed frequency, not to exceed five years, as specified in the area of review and corrective action plan, or when monitoring and operational conditions warrant, owners or operators must:	40 CFR §146.84(e)		
Reevaluate the area of review in the same manner specified in paragraph (c)(1) of this section;	40 CFR §146.84(e)(1)		
Identify all wells in the reevaluated area of review that require corrective action in the same manner specified in paragraph (c) of this section;	40 CFR §146.84(e)(2)		
Perform corrective action on wells requiring corrective action in the reevaluated area of review in the same manner specified in paragraph (d) of this section; and	40 CFR §146.84(e)(3)		
Submit an amended area of review and corrective action plan or demonstrate to the Director through monitoring data and modeling results that no amendment to the area of review and corrective action plan is needed. Any amendments to the area of review and corrective action plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at §§144.39 or 144.41 of this chapter, as appropriate.	40 CFR §146.84(e)(4)		
The emergency and remedial response plan (as required by §146.94) and the demonstration of financial responsibility (as described by §146.85) must account for the area of review delineated as specified in paragraph (c)(1) of this section or the most recently evaluated area of review delineated under paragraph (e) of this section, regardless of whether or not corrective action in the area of review is phased.	40 CFR §146.84(f)		
All modeling inputs and data used to support area of review reevaluations under paragraph (e) of this section shall be retained for 10 years.	40 CFR §146.84(g)		
40 CFR §146.85 Financial responsibility.			
The owner or operator must demonstrate and maintain financial responsibility as determined by the Director that meets the following conditions:	40 CFR §146.85(a)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
The financial responsibility instrument(s) used must be from the following list of qualifying instruments:	40 CFR §146.85(a)(1)		
Trust Funds	40 CFR §146.85(a)(1)(i)		
Surety Bonds	40 CFR §146.85(a)(1)(ii)		
Letter of Credit	40 CFR §146.85(a)(1)(iii)		
Insurance	40 CFR §146.85(a)(1)(iv)		
Self Insurance (i.e., Financial Test and Corporate Guarantee)	40 CFR §146.85(a)(1)(v)		
Escrow Account	40 CFR §146.85(a)(1)(vi)		
Any other instrument(s) satisfactory to the Director	40 CFR §146.85(a)(1)(vii)		
The qualifying instrument(s) must be sufficient to cover the cost of:	40 CFR §146.85(a)(2)		
Corrective action (that meets the requirements of §146.84);	40 CFR §146.85(a)(2)(i)		
Injection well plugging (that meets the requirements of §146.92);	40 CFR §146.85(a)(2)(ii)		
Post injection site care and site closure (that meets the requirements of §146.93); and	40 CFR §146.85(a)(2)(iii)		
Emergency and remedial response (that meets the requirements of §146.94).	40 CFR §146.85(a)(2)(iv)		
The financial responsibility instrument(s) must be sufficient to address endangerment of underground sources of drinking water.	40 CFR §146.85(a)(3)		
The qualifying financial responsibility instrument(s) must comprise protective conditions of coverage.	40 CFR §146.85(a)(4)		
Protective conditions of coverage must include at a minimum cancellation, renewal, and continuation provisions, specifications on when the provider becomes liable following a notice of cancellation if there is a failure to renew with a new qualifying financial instrument, and requirements for the provider to meet a minimum rating, minimum capitalization, and ability to pass the bond rating when applicable.	40 CFR §146.85(a)(4)(i)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
Cancellation – for purposes of this part, an owner or operator must provide that their financial mechanism may not cancel, terminate or fail to renew except for failure to pay such financial instrument. If there is a failure to pay the financial instrument, the financial institution may elect to cancel, terminate, or fail to renew the instrument by sending notice by certified mail to the owner or operator and the Director. The cancellation must not be final for 120 days after receipt of cancellation notice. The owner or operator must provide an alternate financial responsibility demonstration within 60 days of notice of cancellation, and if an alternate financial responsibility demonstration is not acceptable (or possible), any funds from the instrument being cancelled must be released within 60 days of notification by the Director.	40 CFR §146.85(a)(4)(i)(A)		
Renewal – for purposes of this part, owners or operators must renew all financial instruments, if an instrument expires, for the entire term of the geologic sequestration project. The instrument may be automatically renewed as long as the owner or operator has the option of renewal at the face amount of the expiring instrument. The automatic renewal of the instrument must, at a minimum, provide the holder with the option of renewal at the face amount of the expiring financial instrument.	40 CFR §146.85(a)(4)(i)(B)		
Cancellation, termination, or failure to renew may not occur and the financial instrument will remain in full force and effect in the event that on or before the date of expiration: the Director deems the facility abandoned; or the permit is terminated or revoked or a new permit is denied; or closure is ordered by the Director or a U.S. district court or other court of competent jurisdiction; or the owner or operator is named as debtor in a voluntary or involuntary proceeding under Title 11 (Bankruptcy), U.S. Code; or the amount due is paid.	40 CFR §146.85(a)(4)(i)(C)		
The qualifying financial responsibility instrument(s) must be approved by the Director.	40 CFR §146.85(a)(5)		
The Director shall consider and approve the financial responsibility demonstration for all the phases of the geologic sequestration project prior to issue a Class VI permit (§146.82).	40 CFR §146.85(a)(5)(i)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
The owner or operator must provide any updated information related to their financial responsibility instrument(s) on an annual basis and if there are any changes, the Director must evaluate, within a reasonable time, the financial responsibility demonstration to confirm that the instrument(s) used remain adequate for use. The owner or operator must maintain financial responsibility requirements regardless of the status of the Director's review of the financial responsibility demonstration.	40 CFR §146.85(a)(5)(ii)		
The Director may disapprove the use of a financial instrument if he determines that it is not sufficient to meet the requirements of this section.	40 CFR §146.85(a)(5)(iii)		
The owner or operator may demonstrate financial responsibility by using one or multiple qualifying financial instruments for specific phases of the geologic sequestration project.	40 CFR §146.85(a)(6)		
In the event that the owner or operator combines more than one instrument for a specific geologic sequestration phase (e.g., well plugging), such combination must be limited to instruments that are not based on financial strength or performance (i.e., self insurance or performance bond), for example trust funds, surety bonds guaranteeing payment into a trust fund, letters of credit, escrow account, and insurance. In this case, it is the combination of mechanisms, rather than the single mechanism, which must provide financial responsibility for an amount at least equal to the current cost estimate.	40 CFR §146.85(a)(6)(i)		
When using a third-party instrument to demonstrate financial responsibility, the owner or operator must provide a proof that the third-party providers either have passed financial strength requirements based on credit ratings; or has met a minimum rating, minimum capitalization, and ability to pass the bond rating when applicable.	40 CFR §146.85(a)(6)(ii)		
An owner or operator using certain types of third party instruments must establish a standby trust to enable EPA to be party to the financial responsibility agreement without EPA being the beneficiary of any funds. The standby trust fund must be used along with other financial responsibility instruments (e.g., surety bonds, letters of credit, or escrow accounts) to provide a location to place funds if needed.	40 CFR §146.85(a)(6)(iii)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
An owner or operator may deposit money to an escrow account to cover financial responsibility requirements; this account must segregate funds sufficient to cover estimated costs for Class VI (geologic sequestration) financial responsibility from other accounts and uses.	40 CFR §146.85(a)(6)(iv)		
An owner or operator or its guarantor may use self insurance to demonstrate financial responsibility for geologic sequestration projects. In order to satisfy this requirement the owner or operator must meet a Tangible Net Worth of an amount approved by the Director, have a Net working capital and tangible net worth each at least six times the sum of the current well plugging, post injection site care and site closure cost, have assets located in the United States amounting to at least 90 percent of total assets or at least six times the sum of the current well plugging, post injection site care and site closure cost, and must submit a report of its bond rating and financial information annually. In addition the owner or operator must either: have a bond rating test of AAA, AA, A, or BBB as issued by Standard & Poor's or Aaa, Aa, A, or Baa as issued by Moody's; or meet all of the following five financial ratio thresholds: a ratio of total liabilities to net worth less than 2.0; a ratio of current assets to current liabilities greater than 1.5; a ratio of the sum of net income plus depreciation, depletion, and amortization to total liabilities greater than 0.1; a ratio of current assets minus current liabilities to total assets greater than -0.1; and a net profit (revenues minus expenses) greater than 0.	40 CFR §146.85(a)(6)(v)		
An owner or operator who is not able to meet corporate financial test criteria may arrange a corporate guarantee by demonstrating that its corporate parent meets the financial test requirements on its behalf. The parent's demonstration that it meets the financial test requirement is insufficient if it has not also guaranteed to fulfill the obligations for the owner or operator.	40 CFR §146.85(a)(6)(vi)		
An owner or operator may obtain an insurance policy to cover the estimated costs of geologic sequestration activities requiring financial responsibility. This insurance policy must be obtained from a third party provider.	40 CFR §146.85(a)(6)(vii)		
The requirement to maintain adequate financial responsibility and resources is directly enforceable regardless of whether the requirement is a condition of the permit.	40 CFR §146.85(b)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
The owner or operator must maintain financial responsibility and resources until:	40 CFR §146.85(b)(1)		
The Director receives and approves the completed post-injection site care and site closure plan; and	40 CFR §146.85(b)(1)(i)		
The Director approves site closure.	40 CFR §146.85(b)(1)(ii)		
The owner or operator may be released from a financial instrument in the following circumstances:	40 CFR §146.85(b)(2)		
The owner or operator has completed the phase of the geologic sequestration project for which the financial instrument was required and has fulfilled all its financial obligations as determined by the Director, including obtaining financial responsibility for the next phase of the GS project, if required; or	40 CFR §146.85(b)(2)(i)		
The owner or operator has submitted a replacement financial instrument and received written approval from the Director accepting the new financial instrument and releasing the owner or operator from the previous financial instrument.	40 CFR §146.85(b)(2)(ii)		
The owner or operator must have a detailed written estimate, in current dollars, of the cost of performing corrective action on wells in the area of review, plugging the injection well(s), post-injection site care and site closure, and emergency and remedial response.	40 CFR §146.85(c)		
The cost estimate must be performed for each phase separately and must be based on the costs to the regulatory agency of hiring a third party to perform the required activities. A third party is a party who is not within the corporate structure of the owner or operator.	40 CFR §146.85(c)(1)		
During the active life of the geologic sequestration project, the owner or operator must adjust the cost estimate for inflation within 60 days prior to the anniversary date of the establishment of the financial instrument(s) used to comply with paragraph (a) of this section and provide this adjustment to the Director. The owner or operator must also provide to the Director written updates of adjustments to the cost estimate within 60 days of any amendments to the area of review and corrective action plan (§146.84), the injection well plugging plan (§146.92), the post-injection site care and site closure plan (§146.93), and the emergency and remedial response plan (§146.94).	40 CFR §146.85(c)(2)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
The Director must approve any decrease or increase to the initial cost estimate. During the active life of the geologic sequestration project, the owner or operator must revise the cost estimate no later than 60 days after the Director has approved the request to modify the area of review and corrective action plan (§146.84), the injection well plugging plan (§146.92), the post-injection site care and site closure plan (§146.93), and the emergency and response plan (§146.94), if the change in the plan increases the cost. If the change to the plans decreases the cost, any withdrawal of funds must be approved by the Director. Any decrease to the value of the financial assurance instrument must first be approved by the Director. The revised cost estimate must be adjusted for inflation as specified at paragraph (c)(2) of this section.	40 CFR §146.85(c)(3)		
Whenever the current cost estimate increases to an amount greater than the face amount of a financial instrument currently in use, the owner or operator, within 60 days after the increase, must either cause the face amount to be increased to an amount at least equal to the current cost estimate and submit evidence of such increase to the Director, or obtain other financial responsibility instruments to cover the increase. Whenever the current cost estimate decreases, the face amount of the financial assurance instrument may be reduced to the amount of the current cost estimate only after the owner or operator has received written approval from the Director.	40 CFR §146.85(c)(4)		
The owner or operator must notify the Director by certified mail of adverse financial conditions such as bankruptcy that may affect the ability to carry out injection well plugging and post-injection site care and site closure.	40 CFR §146.85(d)		
In the event that the owner or operator or the third party provider of a financial responsibility instrument is going through a bankruptcy, the owner or operator must notify the Director by certified mail of the commencement of a voluntary or involuntary proceeding under Title 11 (Bankruptcy), U.S. Code, naming the owner or operator as debtor, within 10 days after commencement of the proceeding.	40 CFR §146.85(d)(1)		
A guarantor of a corporate guarantee must make such a notification to the Director if he/she is named as debtor, as required under the terms of the corporate guarantee.	40 CFR §146.85(d)(2)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
An owner or operator who fulfills the requirements of paragraph (a) of this section by obtaining a trust fund, surety bond, letter of credit, escrow account, or insurance policy will be deemed to be without the required financial assurance in the event of bankruptcy of the trustee or issuing institution, or a suspension or revocation of the authority of the trustee institution to act as trustee of the institution issuing the trust fund, surety bond, letter of credit, escrow account, or insurance policy. The owner or operator must establish other financial assurance within 60 days after such an event.	40 CFR §146.85(d)(3)		
The owner or operator must provide an adjustment of the cost estimate to the Director within 60 days of notification by the Director, if the Director determines during the annual evaluation of the qualifying financial responsibility instrument(s) that the most recent demonstration is no longer adequate to cover the cost of corrective action (as required by §146.84), injection well plugging (as required by §146.92), post-injection site care and site closure (as required by §146.93), and emergency and remedial response (as required by §146.94).	40 CFR §146.85(e)		
The Director must approve the use and length of pay-in-periods for trust funds or escrow accounts.	40 CFR §146.85(f)		
40 CFR §146.86 Injection well construction requirements.			
General. The owner or operator must ensure that all Class VI wells are constructed and completed to:	40 CFR §146.86(a)		
Prevent the movement of fluids into or between USDWs or into any unauthorized zones;	40 CFR §146.86(a)(1)		
Permit the use of appropriate testing devices and workover tools; and	40 CFR §146.86(a)(2)		
Permit continuous monitoring of the annulus space between the injection tubing and long string casing.	40 CFR §146.86(a)(3)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
Casing and Cementing of Class VI Wells.	40 CFR §146.86(b)		
Casing and cement or other materials used in the construction of each Class VI well must have sufficient structural strength and be designed for the life of the geologic sequestration project. All well materials must be compatible with fluids with which the materials may be expected to come into contact and must meet or exceed standards developed for such materials by the American Petroleum Institute, ASTM International, or comparable standards acceptable to the Director. The casing and cementing program must be designed to prevent the movement of fluids into or between USDWs. In order to allow the Director to determine and specify casing and cementing requirements, the owner or operator must provide the following information:	40 CFR §146.86(b)(1)		
Depth to the injection zone(s);	40 CFR §146.86(b)(1)(i)		
Injection pressure, external pressure, internal pressure, and axial loading;	40 CFR §146.86(b)(1)(ii)		
Hole size;	40 CFR §146.86(b)(1)(iii)		
Size and grade of all casing strings (wall thickness, external diameter, nominal weight, length, joint specification, and construction material);	40 CFR §146.86(b)(1)(iv)		
Corrosiveness of the carbon dioxide stream and formation fluids;	40 CFR §146.86(b)(1)(v)		
Down-hole temperatures;	40 CFR §146.86(b)(1)(vi)		
Lithology of injection and confining zone(s);	40 CFR §146.86(b)(1)(vii)		
Type or grade of cement and cement additives; and	40 CFR §146.86(b)(1)(viii)		
Quantity, chemical composition, and temperature of the carbon dioxide stream.	40 CFR §146.86(b)(1)(ix)		
Surface casing must extend through the base of the lowermost USDW and be cemented to the surface through the use of a single or multiple strings of casing and cement.	40 CFR §146.86(b)(2)		
At least one long string casing, using a sufficient number of centralizers, must extend to the injection zone and must be cemented by circulating cement to the surface in one or more stages.	40 CFR §146.86(b)(3)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
Circulation of cement may be accomplished by staging. The Director may approve an alternative method of cementing in cases where the cement cannot be recirculated to the surface, provided the owner or operator can demonstrate by using logs that the cement does not allow fluid movement behind the well bore.	40 CFR §146.86(b)(4)		
Cement and cement additives must be compatible with the carbon dioxide stream and formation fluids and of sufficient quality and quantity to maintain integrity over the design life of the geologic sequestration project. The integrity and location of the cement shall be verified using technology capable of evaluating cement quality radially and identifying the location of channels to ensure that USDWs are not endangered.	40 CFR §146.86(b)(5)		
Tubing and packer.	40 CFR §146.86(c)		
Tubing and packer materials used in the construction of each Class VI well must be compatible with fluids with which the materials may be expected to come into contact and must meet or exceed standards developed for such materials by the American Petroleum Institute, ASTM International, or comparable standards acceptable to the Director.	40 CFR §146.86(c)(1)		
All owners or operators of Class VI wells must inject fluids through tubing with a packer set at a depth opposite a cemented interval at the location approved by the Director.	40 CFR §146.86(c)(2)		
In order for the Director to determine and specify requirements for tubing and packer, the owner or operator must submit the following information:	40 CFR §146.86(c)(3)		
Depth of setting;	40 CFR §146.86(c)(3)(i)		
Characteristics of the carbon dioxide stream (chemical content, corrosiveness, temperature, and density) and formation fluids;	40 CFR §146.86(c)(3)(ii)		
Maximum proposed injection pressure;	40 CFR §146.86(c)(3)(iii)		
Maximum proposed annular pressure;	40 CFR §146.86(c)(3)(iv)		
Proposed injection rate (intermittent or continuous) and volume and/or mass of the carbon dioxide stream;	40 CFR §146.86(c)(3)(v)		
Size of tubing and casing; and	40 CFR §146.86(c)(3)(vi)		
Tubing tensile, burst, and collapse strengths.	40 CFR §146.86(c)(3)(vii)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
40 CFR §146.87 Logging, sampling, and testing prior to injection well operation.			
During the drilling and construction of a Class VI injection well, the owner or operator must run appropriate logs, surveys and tests to determine or verify the depth, thickness, porosity, permeability, and lithology of, and the salinity of any formation fluids in all relevant geologic formations to ensure conformance with the injection well construction requirements under §146.86 and to establish accurate baseline data against which future measurements may be compared. The owner or operator must submit to the Director a descriptive report prepared by a knowledgeable log analyst that includes an interpretation of the results of such logs and tests. At a minimum, such logs and tests must include:	40 CFR §146.87(a)		
Deviation checks during drilling on all holes constructed by drilling a pilot hole which is enlarged by reaming or another method. Such checks must be at sufficiently frequent intervals to determine the location of the borehole and to ensure that vertical avenues for fluid movement in the form of diverging holes are not created during drilling; and	40 CFR §146.87(a)(1)		
Before and upon installation of the surface casing:	40 CFR §146.87(a)(2)		
Resistivity, spontaneous potential, and caliper logs before the casing is installed; and	40 CFR §146.87(a)(2)(i)		
A cement bond and variable density log to evaluate cement quality radially, and a temperature log after the casing is set and cemented.	40 CFR §146.87(a)(2)(ii)		
Before and upon installation of the long string casing:	40 CFR §146.87(a)(3)		
Resistivity, spontaneous potential, porosity, caliper, gamma ray, fracture finder logs, and any other logs the Director requires for the given geology before the casing is installed; and	40 CFR §146.87(a)(3)(i)		
A cement bond and variable density log, and a temperature log after the casing is set and cemented.	40 CFR §146.87(a)(3)(ii)		
A series of tests designed to demonstrate the internal and external mechanical integrity of injection wells, which may include:	40 CFR §146.87(a)(4)		
A pressure test with liquid or gas;	40 CFR §146.87(a)(4)(i)		
A tracer survey such as oxygen-activation logging;	40 CFR §146.87(a)(4)(ii)		
A temperature or noise log;	40 CFR §146.87(a)(4)(iii)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
A casing inspection log; and	40 CFR §146.87(a)(4)(iv)		
Any alternative methods that provide equivalent or better information and that are required by and/or approved of by the Director.	40 CFR §146.87(a)(5)		
The owner or operator must take whole cores or sidewall cores of the injection zone and confining system and formation fluid samples from the injection zone(s), and must submit to the Director a detailed report prepared by a log analyst that includes: well log analyses (including well logs), core analyses, and formation fluid sample information. The Director may accept information on cores from nearby wells if the owner or operator can demonstrate that core retrieval is not possible and that such cores are representative of conditions at the well. The Director may require the owner or operator to core other formations in the borehole.	40 CFR §146.87(b)		
The owner or operator must record the fluid temperature, pH, conductivity, reservoir pressure, and static fluid level of the injection zone(s).	40 CFR §146.87(c)		
At a minimum, the owner or operator must determine or calculate the following information concerning the injection and confining zone(s):	40 CFR §146.87(d)		
Fracture pressure;	40 CFR §146.87(d)(1)		
Other physical and chemical characteristics of the injection and confining zone(s); and	40 CFR §146.87(d)(2)		
Physical and chemical characteristics of the formation fluids in the injection zone(s).	40 CFR §146.87(d)(3)		
Upon completion, but prior to operation, the owner or operator must conduct the following tests to verify hydrogeologic characteristics of the injection zone(s):	40 CFR §146.87(e)		
A pressure fall-off test; and,	40 CFR §146.87(e)(1)		
A pump test; or	40 CFR §146.87(e)(2)		
Injectivity tests.	40 CFR §146.87(e)(3)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
The owner or operator must provide the Director with the opportunity to witness all logging and testing by this subpart. The owner or operator must submit a schedule of such activities to the Director 30 days prior to conducting the first test and submit any changes to the schedule 30 days prior to the next scheduled test.	40 CFR §146.87(f)		
40 CFR §146.88 Injection well operating requirements.			
Except during stimulation, the owner or operator must ensure that injection pressure does not exceed 90 percent of the fracture pressure of the injection zone(s) so as to ensure that the injection does not initiate new fractures or propagate existing fractures in the injection zone(s). In no case may injection pressure initiate fractures in the confining zone(s) or cause the movement of injection or formation fluids that endangers a USDW. Pursuant to requirements at §146.82(a)(9), all stimulation programs must be approved by the Director as part of the permit application and incorporated into the permit.	40 CFR §146.88(a)		
Injection between the outermost casing protecting USDWs and the well bore is prohibited.	40 CFR §146.88(b)		
The owner or operator must fill the annulus between the tubing and the long string casing with a non-corrosive fluid approved by the Director. The owner or operator must maintain on the annulus a pressure that exceeds the operating injection pressure, unless the Director determines that such requirement might harm the integrity of the well or endanger USDWs.	40 CFR §146.88(c)		
Other than during periods of well workover (maintenance) approved by the Director in which the sealed tubing-casing annulus is disassembled for maintenance or corrective procedures, the owner or operator must maintain mechanical integrity of the injection well at all times.	40 CFR §146.88(d)		
The owner or operator must install and use:	40 CFR §146.88(e)		
Continuous recording devices to monitor: the injection pressure; the rate, volume and/or mass, and temperature of the carbon dioxide stream; and the pressure on the annulus between the tubing and the long string casing and annulus fluid volume; and	40 CFR §146.88(e)(1)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
Alarms and automatic surface shut-off systems or, at the discretion of the Director, down-hole shut-off systems (e.g., automatic shut-off, check valves) for onshore wells or, other mechanical devices that provide equivalent protection; and	40 CFR §146.88(e)(2)		
Alarms and automatic down-hole shut-off systems for wells located offshore but within State territorial waters, designed to alert the operator and shut-in the well when operating parameters such as annulus pressure, injection rate, or other parameters diverge beyond permitted ranges and/or gradients specified in the permit.	40 CFR §146.88(e)(3)		
If a shutdown (i.e., down-hole or at the surface) is triggered or a loss of mechanical integrity is discovered, the owner or operator must immediately investigate and identify as expeditiously as possible the cause of the shutoff. If, upon such investigation, the well appears to be lacking mechanical integrity, or if monitoring required under paragraph (e) of this section otherwise indicates that the well may be lacking mechanical integrity, the owner or operator must:	40 CFR §146.88(f)		
Immediately cease injection;	40 CFR §146.88(f)(1)		
Take all steps reasonably necessary to determine whether there may have been a release of the injected carbon dioxide stream or formation fluids into any unauthorized zone;	40 CFR §146.88(f)(2)		
Notify the Director within 24 hours;	40 CFR §146.88(f)(3)		
Restore and demonstrate mechanical integrity to the satisfaction of the Director prior to resuming injection; and	40 CFR §146.88(f)(4)		
Notify the Director when injection can be expected to resume.	40 CFR §146.88(f)(5)		
40 CFR §146.89 Mechanical integrity.			
A Class VI well has mechanical integrity if:	40 CFR §146.89(a)		
There is no significant leak in the casing, tubing, or packer; and	40 CFR §146.89(a)(1)		
There is no significant fluid movement into a USDW through channels adjacent to the injection well bore.	40 CFR §146.89(a)(2)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
To evaluate the absence of significant leaks under paragraph (a)(1) of this section, owners or operators must, following an initial annulus pressure test, continuously monitor injection pressure, rate, injected volumes; pressure on the annulus between tubing and long-string casing; and annulus fluid volume as specified in §146.88 (e);	40 CFR §146.89(b)		
At least once per year, the owner or operator must use one of the following methods to determine the absence of significant fluid movement under paragraph (a)(2) of this section:	40 CFR §146.89(c)		
An approved tracer survey such as an oxygen-activation log; or	40 CFR §146.89(c)(1)		
A temperature or noise log.	40 CFR §146.89(c)(2)		
If required by the Director, at a frequency specified in the testing and monitoring plan required at §146.90, the owner or operator must run a casing inspection log to determine the presence or absence of corrosion in the long-string casing.	40 CFR §146.89(d)		
The Director may require any other test to evaluate mechanical integrity under paragraphs (a)(1) or (a)(2) of this section. Also, the Director may allow the use of a test to demonstrate mechanical integrity other than those listed above with the written approval of the Administrator. To obtain approval for a new mechanical integrity test, the Director must submit a written request to the Administrator setting forth the proposed test and all technical data supporting its use. The Administrator may approve the request if he or she determines that it will reliably demonstrate the mechanical integrity of wells for which its use is proposed. Any alternate method approved by the Administrator will be published in the *Federal Register* and may be used in all States in accordance with applicable State law unless its use is restricted at the time of approval by the Administrator.	40 CFR §146.89(e)		
In conducting and evaluating the tests enumerated in this section or others to be allowed by the Director, the owner or operator and the Director must apply methods and standards generally accepted in the industry. When the owner or operator reports the results of mechanical integrity tests to the Director, he/she shall include a description of the test(s) and the method(s) used. In making his/her evaluation, the Director must review monitoring and other test data submitted since the previous evaluation.	40 CFR §146.89(f)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
The Director may require additional or alternative tests if the results presented by the owner or operator under paragraphs (a) through (d) of this section are not satisfactory to the Director to demonstrate that there is no significant leak in the casing, tubing, or packer, or to demonstrate that there is no significant movement of fluid into a USDW resulting from the injection activity as stated in paragraphs (a)(1) and (2) of this section.	40 CFR §146.89(g)		
40 CFR §146.90 Testing and monitoring requirements.			
The owner or operator of a Class VI well must prepare, maintain, and comply with a testing and monitoring plan to verify that the geologic sequestration project is operating as permitted and is not endangering USDWs. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit. The testing and monitoring plan must be submitted with the permit application, for Director approval, and must include a description of how the owner or operator will meet the requirements of this section, including accessing sites for all necessary monitoring and testing during the life of the project. Testing and monitoring associated with geologic sequestration projects must, at a minimum, include:	40 CFR §146.90		
Analysis of the carbon dioxide stream with sufficient frequency to yield data representative of its chemical and physical characteristics;	40 CFR §146.90(a)		
Installation and use, except during well workovers as defined in §146.88(d), of continuous recording devices to monitor injection pressure, rate, and volume; the pressure on the annulus between the tubing and the long string casing; and the annulus fluid volume added;	40 CFR §146.90(b)		
Corrosion monitoring of the well materials for loss of mass, thickness, cracking, pitting, and other signs of corrosion, which must be performed on a quarterly basis to ensure that the well components meet the minimum standards for material strength and performance set forth in §146.86(b), by:	40 CFR §146.90(c)		
Analyzing coupons of the well construction materials placed in contact with the carbon dioxide stream; or	40 CFR §146.90(c)(1)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
Routing the carbon dioxide stream through a loop constructed with the material used in the well and inspecting the materials in the loop; or	40 CFR §146.90(c)(2)		
Using an alternative method approved by the Director;	40 CFR §146.90(c)(3)		
Periodic monitoring of the ground water quality and geochemical changes above the confining zone(s) that may be a result of carbon dioxide movement through the confining zone(s) or additional identified zones including:	40 CFR §146.90(d)		
The location and number of monitoring wells based on specific information about the geologic sequestration project, including injection rate and volume, geology, the presence of artificial penetrations, and other factors; and	40 CFR §146.90(d)(1)		
The monitoring frequency and spatial distribution of monitoring wells based on baseline geochemical data that has been collected under §146.82(a)(6) and on any modeling results in the area of review evaluation required by §146.84(c).	40 CFR §146.90(d)(2)		
A demonstration of external mechanical integrity pursuant to §146.89(c) at least once per year until the injection well is plugged; and, if required by the Director, a casing inspection log pursuant to requirements at §146.89(d) at a frequency established in the testing and monitoring plan;	40 CFR §146.90(e)		
A pressure fall-off test at least once every five years unless more frequent testing is required by the Director based on site-specific information;	40 CFR §146.90(f)		
Testing and monitoring to track the extent of the carbon dioxide plume and the presence or absence of elevated pressure (e.g., the pressure front) by using:	40 CFR §146.90(g)		
Direct methods in the injection zone(s); and,	40 CFR §146.90(g)(1)		
Indirect methods (e.g., seismic, electrical, gravity, or electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the Director determines, based on site-specific geology, that such methods are not appropriate;	40 CFR §146.90(g)(2)		
The Director may require surface air monitoring and/or soil gas monitoring to detect movement of carbon dioxide that could endanger a USDW.	40 CFR §146.90(h)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
Design of Class VI surface air and/or soil gas monitoring must be based on potential risks to USDWs within the area of review;	40 CFR §146.90(h)(1)		
The monitoring frequency and spatial distribution of surface air monitoring and/or soil gas monitoring must be decided using baseline data, and the monitoring plan must describe how the proposed monitoring will yield useful information on the area of review delineation and/or compliance with standards under §144.12 of this chapter;	40 CFR §146.90(h)(2)		
If an owner or operator demonstrates that monitoring employed under §§98.440 to 98.449 of this chapter (Clean Air Act, 42 U.S.C. 7401 et seq.) accomplishes the goals of (h)(1) and (2) of this section, and meets the requirements pursuant to §146.91(c)(5), a Director that requires surface air/soil gas monitoring must approve the use of monitoring employed under §§98.440 to 98.449 of this chapter. Compliance with §§98.440 to 98.449 of this chapter pursuant to this provision is considered a condition of the Class VI permit;	40 CFR §146.90(h)(3)		
Any additional monitoring, as required by the Director, necessary to support, upgrade, and improve computational modeling of the area of review evaluation required under §146.84(c) and to determine compliance with standards under §144.12 of this chapter;	40 CFR §146.90(i)		
The owner or operator shall periodically review the testing and monitoring plan to incorporate monitoring data collected under this subpart, operational data collected under §146.88, and the most recent area of review reevaluation performed under §146.84(e). In no case shall the owner or operator review the testing and monitoring plan less often than once every five years. Based on this review, the owner or operator shall submit an amended testing and monitoring plan or demonstrate to the Director that no amendment to the testing and monitoring plan is needed. Any amendments to the testing and monitoring plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at §§144.39 or 144.41 of this chapter, as appropriate. Amended plans or demonstrations shall be submitted to the Director as follows:	40 CFR §146.90(j)		
Within one year of an area of review reevaluation;	40 CFR §146.90(j)(1)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
Following any significant changes to the facility, such as addition of monitoring wells or newly permitted injection wells within the area of review, on a schedule determined by the Director; or	40 CFR §146.90(j)(2)		
When required by the Director.	40 CFR §146.90(j)(3)		
A quality assurance and surveillance plan for all testing and monitoring requirements.	40 CFR §146.90(k)		
40 CFR §146.91 Reporting requirements.			
The owner or operator must, at a minimum, provide, as specified in paragraph (e) of this section, the following reports to the Director, for each permitted Class VI well:	40 CFR §146.91		
Semi-annual reports containing:	40 CFR §146.91(a)		
Any changes to the physical, chemical, and other relevant characteristics of the carbon dioxide stream from the proposed operating data;	40 CFR §146.91(a)(1)		
Monthly average, maximum, and minimum values for injection pressure, flow rate and volume, and annular pressure;	40 CFR §146.91(a)(2)		
A description of any event that exceeds operating parameters for annulus pressure or injection pressure specified in the permit;	40 CFR §146.91(a)(3)		
A description of any event which triggers a shut-off device required pursuant to §146.88(e) and the response taken;	40 CFR §146.91(a)(4)		
The monthly volume and/or mass of the carbon dioxide stream injected over the reporting period and the volume injected cumulatively over the life of the project;	40 CFR §146.91(a)(5)		
Monthly annulus fluid volume added; and	40 CFR §146.91(a)(6)		
The results of monitoring prescribed under §146.90.	40 CFR §146.91(a)(7)		
Report, within 30 days, the results of:	40 CFR §146.91(b)		
Periodic tests of mechanical integrity;	40 CFR §146.91(b)(1)		
Any well workover; and,	40 CFR §146.91(b)(2)		
Any other test of the injection well conducted by the permittee if required by the Director.	40 CFR §146.91(b)(3)		
Report, within 24 hours:	40 CFR §146.91(c)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
Any evidence that the injected carbon dioxide stream or associated pressure front may cause an endangerment to a USDW;	40 CFR §146.91(c)(1)		
Any noncompliance with a permit condition, or malfunction of the injection system, which may cause fluid migration into or between USDWs;	40 CFR §146.91(c)(2)		
Any triggering of a shut-off system (i.e., down-hole or at the surface);	40 CFR §146.91(c)(3)		
Any failure to maintain mechanical integrity; or.	40 CFR §146.91(c)(4)		
Pursuant to compliance with the requirement at §146.90(h) for surface air/soil gas monitoring or other monitoring technologies, if required by the Director, any release of carbon dioxide to the atmosphere or biosphere.	40 CFR §146.91(c)(5)		
Owners or operators must notify the Director in writing 30 days in advance of:	40 CFR §146.91(d)		
Any planned well workover;	40 CFR §146.91(d)(1)		
Any planned stimulation activities, other than stimulation for formation testing conducted under §146.82; and	40 CFR §146.91(d)(2)		
Any other planned test of the injection well conducted by the permittee.	40 CFR §146.91(d)(3)		
Regardless of whether a State has primary enforcement responsibility, owners or operators must submit all required reports, submittals, and notifications under subpart H of this part to EPA in an electronic format approved by EPA.	40 CFR §146.91(e)		
Records shall be retained by the owner or operator as follows:	40 CFR §146.91(f)		
All data collected under §146.82 for Class VI permit applications shall be retained throughout the life of the geologic sequestration project and for 10 years following site closure.	40 CFR §146.91(f)(1)		
Data on the nature and composition of all injected fluids collected pursuant to §146.90(a) shall be retained until 10 years after site closure. The Director may require the owner or operator to deliver the records to the Director at the conclusion of the retention period.	40 CFR §146.91(f)(2)		
Monitoring data collected pursuant to §146.90(b) through (i) shall be retained for 10 years after it is collected.	40 CFR §146.91(f)(3)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
Well plugging reports, post-injection site care data, including, if appropriate, data and information used to develop the demonstration of the alternative post-injection site care timeframe, and the site closure report collected pursuant to requirements at §§146.93(f) and (h) shall be retained for 10 years following site closure.	40 CFR §146.91(f)(4)		
The Director has authority to require the owner or operator to retain any records required in this subpart for longer than 10 years after site closure.	40 CFR §146.91(f)(5)		
40 CFR §146.92 Injection well plugging.			
Prior to the well plugging, the owner or operator must flush each Class VI injection well with a buffer fluid, determine bottomhole reservoir pressure, and perform a final external mechanical integrity test.	40 CFR §146.92(a)		
Well Plugging Plan. The owner or operator of a Class VI well must prepare, maintain, and comply with a plan that is acceptable to the Director. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit. The well plugging plan must be submitted as part of the permit application and must include the following information:	40 CFR §146.92(b)		
Appropriate tests or measures for determining bottomhole reservoir pressure;	40 CFR §146.92(b)(1)		
Appropriate testing methods to ensure external mechanical integrity as specified in §146.89;	40 CFR §146.92(b)(2)		
The type and number of plugs to be used;	40 CFR §146.92(b)(3)		
The placement of each plug, including the elevation of the top and bottom of each plug;	40 CFR §146.92(b)(4)		
The type, grade, and quantity of material to be used in plugging. The material must be compatible with the carbon dioxide stream; and	40 CFR §146.92(b)(5)		
The method of placement of the plugs.	40 CFR §146.92(b)(6)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
Notice of intent to plug. The owner or operator must notify the Director in writing pursuant to §146.91(e), at least 60 days before plugging of a well. At this time, if any changes have been made to the original well plugging plan, the owner or operator must also provide the revised well plugging plan. The Director may allow for a shorter notice period. Any amendments to the injection well plugging plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at §§144.39 or 144.41 of this chapter, as appropriate.	40 CFR §146.92(c)		
Plugging report. Within 60 days after plugging, the owner or operator must submit, pursuant to §146.91(e), a plugging report to the Director. The report must be certified as accurate by the owner or operator and by the person who performed the plugging operation (if other than the owner or operator.) The owner or operator shall retain the well plugging report for 10 years following site closure.	40 CFR §146.92(d)		
40 CFR §146.93 Post-injection site care and site closure.			
The owner or operator of a Class VI well must prepare, maintain, and comply with a plan for post-injection site care and site closure that meets the requirements of paragraph (a)(2) of this section and is acceptable to the Director. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit.	40 CFR §146.93(a)		
The owner or operator must submit the post-injection site care and site closure plan as a part of the permit application to be approved by the Director.	40 CFR §146.93(a)(1)		
The post-injection site care and site closure plan must include the following information:	40 CFR §146.93(a)(2)		
The pressure differential between pre-injection and predicted post-injection pressures in the injection zone(s);	40 CFR §146.93(a)(2)(i)		
The predicted position of the carbon dioxide plume and associated pressure front at site closure as demonstrated in the area of review evaluation required under §146.84(c)(1);	40 CFR §146.93(a)(2)(ii)		
A description of post-injection monitoring location, methods, and proposed frequency;	40 CFR §146.93(a)(2)(iii)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
A proposed schedule for submitting post-injection site care monitoring results to the Director pursuant to §146.91(e); and,	40 CFR §146.93(a)(2)(iv)		
The duration of the post-injection site care timeframe and, if approved by the Director, the demonstration of the alternative post-injection site care timeframe that ensures non-endangerment of USDWs.	40 CFR §146.93(a)(2)(v)		
Upon cessation of injection, owners or operators of Class VI wells must either submit an amended post-injection site care and site closure plan or demonstrate to the Director through monitoring data and modeling results that no amendment to the plan is needed. Any amendments to the post-injection site care and site closure plan must be approved by the Director, be incorporated into the permit, and are subject to the permit modification requirements at §§144.39 or 144.41 of this chapter, as appropriate.	40 CFR §146.93(a)(3)		
At any time during the life of the geologic sequestration project, the owner or operator may modify and resubmit the post-injection site care and site closure plan for the Director's approval within 30 days of such change.	40 CFR §146.93(a)(4)		
The owner or operator shall monitor the site following the cessation of injection to show the position of the carbon dioxide plume and pressure front and demonstrate that USDWs are not being endangered.	40 CFR §146.93(b)		
Following the cessation of injection, the owner or operator shall continue to conduct monitoring as specified in the Director-approved post-injection site care and site closure plan for at least 50 years or for the duration of the alternative timeframe approved by the Director pursuant to requirements in paragraph (c) of this section, unless he/she makes a demonstration under (b)(2) of this section. The monitoring must continue until the geologic sequestration project no longer poses an endangerment to USDWs and the demonstration under (b)(2) of this section is submitted and approved by the Director.	40 CFR §146.93(b)(1)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
If the owner or operator can demonstrate to the satisfaction of the Director before 50 years or prior to the end of the approved alternative timeframe based on monitoring and other site-specific data, that the geologic sequestration project no longer poses an endangerment to USDWs, the Director may approve an amendment to the post-injection site care and site closure plan to reduce the frequency of monitoring or may authorize site closure before the end of the 50-year period or prior to the end of the approved alternative timeframe, where he or she has substantial evidence that the geologic sequestration project no longer poses a risk of endangerment to USDWs.	40 CFR §146.93(b)(2)		
Prior to authorization for site closure, the owner or operator must submit to the Director for review and approval a demonstration, based on monitoring and other site-specific data, that no additional monitoring is needed to ensure that the geologic sequestration project does not pose an endangerment to USDWs.	40 CFR §146.93(b)(3)		
If the demonstration in paragraph (b)(3) of this section cannot be made (i.e., additional monitoring is needed to ensure that the geologic sequestration project does not pose an endangerment to USDWs) at the end of the 50-year period or at the end of the approved alternative timeframe, or if the Director does not approve the demonstration, the owner or operator must submit to the Director a plan to continue post-injection site care until a demonstration can be made and approved by the Director.	40 CFR §146.93(b)(4)		
Demonstration of alternative post-injection site care timeframe. At the Director's discretion, the Director may approve, in consultation with EPA, an alternative post-injection site care timeframe other than the 50 year default, if an owner or operator can demonstrate during the permitting process that an alternative post-injection site care timeframe is appropriate and ensures non-endangerment of USDWs. The demonstration must be based on significant, site-specific data and information including all data and information collected pursuant to §§146.82 and 146.83, and must contain substantial evidence that the geologic sequestration project will no longer pose a risk of endangerment to USDWs at the end of the alternative post-injection site care timeframe.	40 CFR §146.93(c)		
A demonstration of an alternative post-injection site care timeframe must include consideration and documentation of:	40 CFR §146.93(c)(1)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
The results of computational modeling performed pursuant to delineation of the area of review under §146.84;	40 CFR §146.93(c)(1)(i)		
The predicted timeframe for pressure decline within the injection zone, and any other zones, such that formation fluids may not be forced into any USDWs; and/or the timeframe for pressure decline to pre-injection pressures;	40 CFR §146.93(c)(1)(ii)		
The predicted rate of carbon dioxide plume migration within the injection zone, and the predicted timeframe for the cessation of migration;	40 CFR §146.93(c)(1)(iii)		
A description of the site-specific processes that will result in carbon dioxide trapping including immobilization by capillary trapping, dissolution, and mineralization at the site;	40 CFR §146.93(c)(1)(iv)		
The predicted rate of carbon dioxide trapping in the immobile capillary phase, dissolved phase, and/or mineral phase;	40 CFR §146.93(c)(1)(v)		
The results of laboratory analyses, research studies, and/or field or site-specific studies to verify the information required in paragraphs (iv) and (v) of this section;	40 CFR §146.93(c)(1)(vi)		
A characterization of the confining zone(s) including a demonstration that it is free of transmissive faults, fractures, and micro-fractures and of appropriate thickness, permeability, and integrity to impede fluid (e.g., carbon dioxide, formation fluids) movement;	40 CFR §146.93(c)(1)(vii)		
The presence of potential conduits for fluid movement including planned injection wells and project monitoring wells associated with the proposed geologic sequestration project or any other projects in proximity to the predicted/modeled, final extent of the carbon dioxide plume and area of elevated pressure;	40 CFR §146.93(c)(1)(viii)		
A description of the well construction and an assessment of the quality of plugs of all abandoned wells within the area of review;	40 CFR §146.93(c)(1)(ix)		
The distance between the injection zone and the nearest USDWs above and/or below the injection zone; and	40 CFR §146.93(c)(1)(x)		
Any additional site-specific factors required by the Director.	40 CFR §146.93(c)(1)(xi)		
Information submitted to support the demonstration in paragraph (c)(1) of this section must meet the following criteria:	40 CFR §146.93(c)(2)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
All analyses and tests performed to support the demonstration must be accurate, reproducible, and performed in accordance with the established quality assurance standards;	40 CFR §146.93(c)(2)(i)		
Estimation techniques must be appropriate and EPA-certified test protocols must be used where available;	40 CFR §146.93(c)(2)(ii)		
Predictive models must be appropriate and tailored to the site conditions, composition of the carbon dioxide stream and injection and site conditions over the life of the geologic sequestration project;	40 CFR §146.93(c)(2)(iii)		
Predictive models must be calibrated using existing information (e.g., at Class I, Class II, or Class V experimental technology well sites) where sufficient data are available;	40 CFR §146.93(c)(2)(iv)		
Reasonably conservative values and modeling assumptions must be used and disclosed to the Director whenever values are estimated on the basis of known, historical information instead of site-specific measurements;	40 CFR §146.93(c)(2)(v)		
An analysis must be performed to identify and assess aspects of the alternative post-injection site care timeframe demonstration that contribute significantly to uncertainty. The owner or operator must conduct sensitivity analyses to determine the effect that significant uncertainty may contribute to the modeling demonstration.	40 CFR §146.93(c)(2)(vi)		
An approved quality assurance and quality control plan must address all aspects of the demonstration; and,	40 CFR §146.93(c)(2)(vii)		
Any additional criteria required by the Director.	40 CFR §146.93(c)(2)(viii)		
Notice of intent for site closure. The owner or operator must notify the Director in writing at least 120 days before site closure. At this time, if any changes have been made to the original post-injection site care and site closure plan, the owner or operator must also provide the revised plan. The Director may allow for a shorter notice period.	40 CFR §146.93(d)		
After the Director has authorized site closure, the owner or operator must plug all monitoring wells in a manner which will not allow movement of injection or formation fluids that endangers a USDW.	40 CFR §146.93(e)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
The owner or operator must submit a site closure report to the Director within 90 days of site closure, which must thereafter be retained at a location designated by the Director for 10 years. The report must include:	40 CFR §146.93(f)		
Documentation of appropriate injection and monitoring well plugging as specified in §146.92 and paragraph (e) of this section. The owner or operator must provide a copy of a survey plat which has been submitted to the local zoning authority designated by the Director. The plat must indicate the location of the injection well relative to permanently surveyed benchmarks. The owner or operator must also submit a copy of the plat to the Regional Administrator of the appropriate EPA Regional Office;	40 CFR §146.93(f)(1)		
Documentation of appropriate notification and information to such State, local and Tribal authorities that have authority over drilling activities to enable such State, local, and Tribal authorities to impose appropriate conditions on subsequent drilling activities that may penetrate the injection and confining zone(s); and	40 CFR §146.93(f)(2)		
Records reflecting the nature, composition, and volume of the carbon dioxide stream.	40 CFR §146.93(f)(3)		
Each owner or operator of a Class VI injection well must record a notation on the deed to the facility property or any other document that is normally examined during title search that will in perpetuity provide any potential purchaser of the property the following information:	40 CFR §146.93(g)		
The fact that land has been used to sequester carbon dioxide;	40 CFR §146.93(g)(1)		
The name of the State agency, local authority, and/or Tribe with which the survey plat was filed, as well as the address of the Environmental Protection Agency Regional Office to which it was submitted; and	40 CFR §146.93(g)(2)		
The volume of fluid injected, the injection zone or zones into which it was injected, and the period over which injection occurred.	40 CFR §146.93(g)(3)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
The owner or operator must retain for 10 years following site closure, records collected during the post-injection site care period. The owner or operator must deliver the records to the Director at the conclusion of the retention period, and the records must thereafter be retained at a location designated by the Director for that purpose.	40 CFR §146.93(h)		
40 CFR §146.94 Emergency and remedial response.			
As part of the permit application, the owner or operator must provide the Director with an emergency and remedial response plan that describes actions the owner or operator must take to address movement of the injection or formation fluids that may cause an endangerment to a USDW during construction, operation, and post-injection site care periods. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit.	40 CFR §146.94(a)		
If the owner or operator obtains evidence that the injected carbon dioxide stream and associated pressure front may cause an endangerment to a USDW, the owner or operator must:	40 CFR §146.94(b)		
Immediately cease injection;	40 CFR §146.94(b)(1)		
Take all steps reasonably necessary to identify and characterize any release;	40 CFR §146.94(b)(2)		
Notify the Director within 24 hours; and	40 CFR §146.94(b)(3)		
Implement the emergency and remedial response plan approved by the Director.	40 CFR §146.94(b)(4)		
The Director may allow the operator to resume injection prior to remediation if the owner or operator demonstrates that the injection operation will not endanger USDWs.	40 CFR §146.94(c)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
The owner or operator shall periodically review the emergency and remedial response plan developed under paragraph (a) of this section. In no case shall the owner or operator review the emergency and remedial response plan less often than once every five years. Based on this review, the owner or operator shall submit an amended emergency and remedial response plan or demonstrate to the Director that no amendment to the emergency and remedial response plan is needed. Any amendments to the emergency and remedial response plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at §§144.39 or 144.41 of this chapter, as appropriate. Amended plans or demonstrations shall be submitted to the Director as follows:	40 CFR §146.94(d)		
Within one year of an area of review reevaluation;	40 CFR §146.94(d)(1)		
Following any significant changes to the facility, such as addition of injection or monitoring wells, on a schedule determined by the Director; or	40 CFR §146.94(d)(2)		
When required by the Director.	40 CFR §146.94(d)(3)		
40 CFR §146.95 Class VI injection depth waiver requirements.			
This section sets forth information which an owner or operator seeking a waiver of the Class VI injection depth requirements must submit to the Director; information the Director must consider in consultation with all affected Public Water System Supervision Directors; the procedure for Director – Regional Administrator communication and waiver issuance; and the additional requirements that apply to owners or operators of Class VI wells granted a waiver of the injection depth requirements.	40 CFR §146.95		
In seeking a waiver of the requirement to inject below the lowermost USDW, the owner or operator must submit a supplemental report concurrent with permit application. The supplemental report must include the following,	40 CFR §146.95(a)		
A demonstration that the injection zone(s) is/are laterally continuous, is not a USDW, and is not hydraulically connected to USDWs; does not outcrop; has adequate injectivity, volume, and sufficient porosity to safely contain the injected carbon dioxide and formation fluids; and has appropriate geochemistry.	40 CFR §146.95(a)(1)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
A demonstration that the injection zone(s) is/are bounded by laterally continuous, impermeable confining units above and below the injection zone(s) adequate to prevent fluid movement and pressure buildup outside of the injection zone(s); and that the confining unit(s) is/are free of transmissive faults and fractures. The report shall further characterize the regional fracture properties and contain a demonstration that such fractures will not interfere with injection, serve as conduits, or endanger USDWs.	40 CFR §146.95(a)(2)		
A demonstration, using computational modeling, that USDWs above and below the injection zone will not be endangered as a result of fluid movement. This modeling should be conducted in conjunction with the area of review determination, as described in §146.84, and is subject to requirements, as described in §146.84(c), and periodic reevaluation, as described in §146.84(e).	40 CFR §146.95(a)(3)		
A demonstration that well design and construction, in conjunction with the waiver, will ensure isolation of the injectate in lieu of requirements at 146.86(a)(1) and will meet well construction requirements in paragraph (f) of this section.	40 CFR §146.95(a)(4)		
A description of how the monitoring and testing and any additional plans will be tailored to the geologic sequestration project to ensure protection of USDWs above and below the injection zone(s), if a waiver is granted.	40 CFR §146.95(a)(5)		
Information on the location of all the public water supplies affected, reasonably likely to be affected, or served by USDWs in the area of review.	40 CFR §146.95(a)(6)		
Any other information requested by the Director to inform the Regional Administrator's decision to issue a waiver.	40 CFR §146.95(a)(7)		
To inform the Regional Administrator's decision on whether to grant a waiver of the injection depth requirements at §§144.6 of this chapter, 146.5(f), and 146.86(a)(1), the Director must submit, to the Regional Administrator, documentation of the following :	40 CFR §146.95(b)		
An evaluation of the following information as it relates to siting, construction, and operation of a geologic sequestration project with a waiver:	40 CFR §146.95(b)(1)		
The integrity of the upper and lower confining units;	40 CFR §146.95(b)(1)(i)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
The suitability of the injection zone(s) (e.g., lateral continuity; lack of transmissive faults and fractures; knowledge of current or planned artificial penetrations into the injection zone(s) or formations below the injection zone);	40 CFR §146.95(b)(1)(ii)		
The potential capacity of the geologic formation(s) to sequester carbon dioxide, accounting for the availability of alternative injection sites;	40 CFR §146.95(b)(1)(iii)		
All other site characterization data, the proposed emergency and remedial response plan, and a demonstration of financial responsibility;	40 CFR §146.95(b)(1)(iv)		
Community needs, demands, and supply from drinking water resources;	40 CFR §146.95(b)(1)(v)		
Planned needs, potential and/or future use of USDWs and non-USDWs in the area;	40 CFR §146.95(b)(1)(vi)		
Planned or permitted water, hydrocarbon, or mineral resource exploitation potential of the proposed injection formation(s) and other formations both above and below the injection zone to determine if there are any plans to drill through the formation to access resources in or beneath the proposed injection zone(s)/formation(s);	40 CFR §146.95(b)(1)(vii)		
The proposed plan for securing alternative resources or treating USDW formation waters in the event of contamination related to the Class VI injection activity; and,	40 CFR §146.95(b)(1)(viii)		
Any other applicable considerations or information requested by the Director.	40 CFR §146.95(b)(1)(ix)		
Consultation with the Public Water System Supervision Directors of all States and Tribes having jurisdiction over lands within the area of review of a well for which a waiver is sought.	40 CFR §146.95(b)(2)		
Any written waiver-related information submitted by the Public Water System Supervision Director(s) to the (UIC) Director.	40 CFR §146.95(b)(3)		
Pursuant to requirements at §124.10 of this chapter and concurrent with the Class VI permit application notice process, the Director shall give public notice that a waiver application has been submitted. The notice shall clearly state:	40 CFR §146.95(c)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
The depth of the proposed injection zone(s);	40 CFR §146.95(c)(1)		
The location of the injection well(s);	40 CFR §146.95(c)(2)		
The name and depth of all USDWs within the area of review;	40 CFR §146.95(c)(3)		
A map of the area of review;	40 CFR §146.95(c)(4)		
The names of any public water supplies affected, reasonably likely to be affected, or served by USDWs in the area of review; and,	40 CFR §146.95(c)(5)		
The results of UIC-Public Water System Supervision consultation required under paragraph (b)(2) of this section.	40 CFR §146.95(c)(6)		
Following public notice, the Director shall provide all information received through the waiver application process to the Regional Administrator. Based on the information provided, the Regional Administrator shall provide written concurrence or non-concurrence regarding waiver issuance.	40 CFR §146.95(d)		
If the Regional Administrator determines that additional information is required to support a decision, the Director shall provide the information. At his or her discretion, the Regional Administrator may require that public notice of the new information be initiated.	40 CFR §146.95(d)(1)		
In no case shall a Director of a State-approved program issue a waiver without receipt of written concurrence from the Regional Administrator.	40 CFR §146.95(d)(2)		
If a waiver is issued, within 30 days of waiver issuance, EPA shall post the following information on the Office of Water's Web site:	40 CFR §146.95(e)		
The depth of the proposed injection zone(s);	40 CFR §146.95(e)(1)		
The location of the injection well(s);	40 CFR §146.95(e)(2)		
The name and depth of all USDWs within the area of review;	40 CFR §146.95(e)(3)		
A map of the area of review;	40 CFR §146.95(e)(4)		
The names of any public water supplies affected, reasonably likely to be affected, or served by USDWs in the area of review; and	40 CFR §146.95(e)(5)		
The date of waiver issuance.	40 CFR §146.95(e)(6)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
Upon receipt of a waiver of the requirement to inject below the lowermost USDW for geologic sequestration, the owner or operator of the Class VI well must comply with:	40 CFR §146.95(f)		
All requirements at §§146.84, 146.85, 146.87, 146.88, 146.89, 146.91, 146.92, and 146.94;	40 CFR §146.95(f)(1)		
All requirements at §146.86 with the following modified requirements:	40 CFR §146.95(f)(2)		
The owner or operator must ensure that Class VI wells with a waiver are constructed and completed to prevent movement of fluids into any unauthorized zones including USDWs, in lieu of requirements at §146.86(a)(1).	40 CFR §146.95(f)(2)(i)		
The casing and cementing program must be designed to prevent the movement of fluids into any unauthorized zones including USDWs in lieu of requirements at §146.86(b)(1).	40 CFR §146.95(f)(2)(ii)		
The surface casing must extend through the base of the nearest USDW directly above the injection zone and be cemented to the surface; or, at the Director's discretion, another formation above the injection zone and below the nearest USDW above the injection zone.	40 CFR §146.95(f)(2)(iii)		
All requirements at §146.90 with the following modified requirements:	40 CFR §146.95(f)(3)		
The owner or operator shall monitor the groundwater quality, geochemical changes, and pressure in the first USDWs immediately above and below the injection zone(s); and in any other formations at the discretion of the Director.	40 CFR §146.95(f)(3)(i)		
Testing and monitoring to track the extent of the carbon dioxide plume and the presence or absence of elevated pressure (e.g., the pressure front) by using direct methods to monitor for pressure changes in the injection zone(s); and, indirect methods (e.g., seismic, electrical, gravity, or electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the Director determines, based on site-specific geology, that such methods are not appropriate.	40 CFR §146.95(f)(3)(ii)		
All requirements at §146.93 with the following, modified post-injection site care monitoring requirements:	40 CFR §146.95(f)(4)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
The owner or operator shall monitor the groundwater quality, geochemical changes and pressure in the first USDWs immediately above and below the injection zone; and in any other formations at the discretion of the Director.	40 CFR §146.95(f)(4)(i)		
Testing and monitoring to track the extent of the carbon dioxide plume and the presence or absence of elevated pressure (e.g., the pressure front) by using direct methods in the injection zone(s); and indirect methods (e.g., seismic, electrical, gravity, or electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the Director determines based on site-specific geology, that such methods are not appropriate;	40 CFR §146.95(f)(4)(ii)		
(5) Any additional requirements requested by the Director designed to ensure protection of USDWs above and below the injection zone(s).	40 CFR §146.95(f)(5)		
STATE UIC PROGRAM REQUIREMENTS			
PART 124--PROCEDURES AND DECISIONMAKING			
SUBPART A--GENERAL PROGRAM REQUIREMENTS			
40 CFR §124.10 Public notice of permit actions and public comment period.			
Methods (applicable to State programs, see 40 CFR 123.25 (NPDES), 145.11 (UIC), 233.23 (404), and 271.14 (RCRA)). Public notice of activities described in paragraph (a)(1) of this section shall be given by the following methods:	40 CFR §124.10(c)		
For Class VI injection well UIC permits, mailing or emailing a notice to State and local oil and gas regulatory agencies and State agencies regulating mineral exploration and recovery, the Director of the Public Water Supply Supervision program in the State, and all agencies that oversee injection wells in the State.	40 CFR §124.10(c)(1)(xi)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
PART 145--STATE UIC PROGRAM REQUIREMENTS			
SUBPART A--GENERAL PROGRAM REQUIREMENTS			
40 CFR §145.1 Purpose and scope.			
States seeking primary enforcement responsibility for Class VI wells must submit a primacy application in accordance with subpart C of this part and meet all requirements of this part. States may apply for primary enforcement responsibility for Class VI wells independently of other injection well classes.	40 CFR §145.1(i)		
SUBPART C--STATE PROGRAM SUBMISSIONS			
40 CFR §145.21 General requirements for program approvals.			
To establish a Federal UIC Class VI program in States not seeking full UIC primary enforcement responsibility approval, pursuant to the SDWA section 1422(c), States shall, by [INSERT DATE 270 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER], submit to the Administrator a new or revised State UIC program complying with §§145.22 or 145.32 of this part. Beginning on [INSERT DATE 270 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] the requirements of subpart H of part 146 will be applicable and enforceable by EPA in each State that has not received approval of a new Class VI program application under section 1422 of the Safe Drinking Water Act or a revision of its UIC program under section 1422 of the Safe Drinking Water Act to incorporate subpart H of part 146. Following [INSERT DATE 270 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER], EPA will publish a list of the States where subpart H of part 146 has become applicable.	40 CFR §145.21(h)		
40 CFR §145.22 Elements of a program submission.			
Any State that seeks to administer a program under this part shall submit to the Administrator at least three copies of a program submission. For Class VI programs, the entire submission can be sent electronically. The submission shall contain the following:	40 CFR §145.22(a)		
Copies of all applicable State statutes and regulations, including those governing State administrative procedures;	40 CFR §145.22(a)(5)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
40 CFR §145.23 Program description.			
Any State that seeks to administer a program under this part shall submit a description of the program it proposes to administer in lieu of the Federal program under State law or under an interstate compact. For Class VI programs, the entire submission can be sent electronically. The program description shall include:	40 CFR §145.23		
A description of applicable State procedures, including permitting procedures and any State administrative or judicial review procedures.	40 CFR §145.23(c)		
Copies of the permit form(s), application form(s), reporting form(s), and manifest format the State intends to employ in its program. Forms used by States need not be identical to the forms used by EPA but should require the same basic information. The State need not provide copies of uniform national forms it intends to use but should note its intention to use such forms. For Class VI programs, submit copies of the current forms in use by the State, if any.	40 CFR §145.23(d)		
A schedule for issuing permits within five years after program approval to all injection wells within the State which are required to have permits under this part and 40 CFR part 144. For Class VI programs, a schedule for issuing permits within two years after program approval;	40 CFR §145.23(f)(1)		
The priorities (according to criteria set forth in §146.9 of this chapter) for issuing permits, including the number of permits in each class of injection well which will be issued each year during the first five years of program operation. For Class VI programs, include the priorities for issuing permits and the number of permits which will be issued during the first two years of program operation;	40 CFR §145.23(f)(2)		
A description of how the Director will implement the mechanical integrity testing requirements of §146.8 of this chapter, or, for Class VI wells, the mechanical integrity testing requirements of §146.89 of this chapter, including the frequency of testing that will be required and the number of tests that will be reviewed by the Director each year;	40 CFR §145.23(f)(3)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
A description of the procedure whereby the Director will notify owners or operators of injection wells of the requirement that they apply for and obtain a permit. The notification required by this paragraph shall require applications to be filed as soon as possible, but not later than four years after program approval for all injection wells requiring a permit. For Class VI programs approved before [INSERT DATE 365 DAYS AFTER PUBLICATION], a description of the procedure whereby the Director will notify owners or operators of any Class I wells previously permitted for the purpose of geologic sequestration or Class V experimental technology wells no longer being used for experimental purposes that will continue injection of carbon dioxide for the purpose of GS that they must apply for a Class VI permit pursuant to requirements at §146.81(c) within one year of [INSERT DATE 365 DAYS AFTER PUBLICATION]. For Class VI programs approved following [INSERT DATE 365 DAYS AFTER PUBLICATION], a description of the procedure whereby the Director will notify owners or operators of any Class I wells previously permitted for the purpose of geologic sequestration or Class V experimental technology wells no longer being used for experimental purposes that will continue injection of carbon dioxide for the purpose of GS or Class VI wells previously permitted by EPA that they must apply for a Class VI permit pursuant to requirements at §146.81(c) within one year of Class VI program approval;	40 CFR §145.23(f)(4)		
A description of aquifers, or parts thereof, which the Director has identified under §144.7(b) as exempted aquifers, and a summary of supporting data. For Class VI programs only, States must incorporate information related to any EPA approved exemptions expanding the areal extent of existing aquifer exemptions for Class II enhanced oil recovery or enhanced gas recovery wells transitioning to Class VI injection for geologic sequestration pursuant to requirements at §§146.4(d) and 144.7(d), including a summary of supporting data and the specific location of the aquifer exemption expansions. Other than expansions of the areal extent of Class II enhanced oil recovery or enhanced gas recovery well aquifer exemptions for Class VI injection, new aquifer exemptions shall not be issued for Class VI wells or injection activities;	40 CFR §145.23(f)(9)		

Federal Requirement	Federal Citation	State Citation (document title, page number, section/paragraph)	Different From Federal Requirement? (explain on separate sheet)
For Class VI programs, a description of the procedure whereby the Director must notify, in writing, any States, Tribes, and Territories of any permit applications for geologic sequestration of carbon dioxide wherein the area of review crosses State, Tribal, or Territory boundaries, resulting in the need for trans-boundary coordination related to an injection operation.	40 CFR §145.23(f)(13)		
40 CFR §145.32 Procedures for revision of State programs.			
******* All requests for expansions to the areal extent of Class II enhanced oil recovery or enhanced gas recovery aquifer exemptions for Class VI wells must be treated as substantial program revisions.	40 CFR §145.32(b)(2)		
PART 147--STATE, TRIBAL, AND EPA-ADMINISTERED UNDERGROUND INJECTION CONTROL PROGRAMS			
SUBPART A--GENERAL PROVISIONS			
40 CFR §147.1 Purpose and scope.			
Class VI well owners or operators must comply with §146.91(e) notwithstanding any State program approvals.	40 CFR §147.1(f)		

***** Indicates that additional language is provided in the Code of Federal Regulations for the original UIC Rule and its amendments. Only language related to the Class VI Rule is provided in this crosswalk.**

Appendix B

Class VI Primacy Application Checklist

Class VI Primacy Application Checklist

REQUIRED ELEMENT		INCLUDED?
New 1422 UIC Program Primacy Applications		
An Attorney General's statement as required by 40 CFR §145.24		Yes ☐ No ☐
A letter from the Governor of the state requesting program approval as required by 40 CFR §145.22 (a)(1)		Yes ☐ No ☐
A complete program description as required by 40 CFR §145.23		Yes ☐ No ☐
	A narrative on the scope, structure, coverage, and processes of the state program [40 CFR §145.23(a)]	Yes ☐ No ☐
	A description of the organizational structure for the Primacy Agency or agencies [40 CFR §145.23(b)]	Yes ☐ No ☐
	Description of the responsibilities of each agency and the procedures for coordination if UIC Program is administered by multiple agencies [40 CFR §145.23(b)]	Yes ☐ No ☐
	Organization charts[40 CFR §145.23(b)]	Yes ☐ No ☐
	Estimated costs and sources of funding for implementing the program for the first two years [40 CFR §145.23(b)]	Yes ☐ No ☐
	A description of permitting, administrative, and judicial review procedures [40 CFR §145.23(c)]	Yes ☐ No ☐
	Copies of permit, application, reporting, and manifest forms [40 CFR §145.23(d)]	Yes ☐ No ☐
	A description of the state's compliance tracking and enforcement program[40 CFR §145.23(e)]	Yes ☐ No ☐
	A schedule for issuing permits [40 CFR §145.23(f)(1)]	Yes ☐ No ☐
	A statement of the state's priorities for issuing Class VI permits and the number of permits that will be issued [40 CFR §145.23(f)(2)]	Yes ☐ No ☐
	A description of how the state will meet the mechanical integrity testing requirements [40 CFR §145.23(f)(3)]	Yes ☐ No ☐
	A description of the state's procedures to notify owners and operators of injection wells of the requirement that they apply for and obtain a permit [40 CFR §145.23(f)(4)]	Yes ☐ No ☐
	A description of the state's transboundary notification procedures [40 CFR §145.23(f)(13)]	Yes ☐ No ☐
	A description of procedures for documenting interstate consultations [40 CFR §145.23(f)(13)]	Yes ☐ No ☐
	A description of how the state will establish and maintain a UIC well inventory [40 CFR §145.23(f)(7)]	Yes ☐ No ☐
	A description of exempted aquifers, expansions of the areal extent of existing aquifer exemptions for Class II EOR/EGR transitioning to Class VI injection, and a summary of supporting data and the specific locations [40 CFR §145.23(f)(9)]	Yes ☐ No ☐
A Memorandum of Agreement with the EPA Regional Administrator as required by 40 CFR §145.25		Yes ☐ No ☐
Copies of all applicable state statutes and regulations, including those governing State administrative procedures as required by 40 CFR §145.25.22(a)(5)		Yes ☐ No ☐
The Federal/State Class VI Regulation Crosswalk		Yes ☐ No ☐
A demonstration of compliance with public participation requirements as required by 40 CFR §145.22(a)(6)		Yes ☐ No ☐
	Copies of all written comments received by the state	Yes ☐ No ☐

	A transcript, recording, or summary of any public hearings	Yes ☐ No ☐
	Responsiveness summary	Yes ☐ No ☐
1422 UIC Program Revision Applications		
An updated Attorney General's statement as required by 40 CFR §145.24		Yes ☐ No ☐
A modified program description		Yes ☐ No ☐
	A description of the organizational structure for the Primacy Agency [40 CFR §145.23(b)]	Yes ☐ No ☐
	Description of the responsibilities of each agency and the procedures for coordination if UIC Program is administered by multiple agencies [40 CFR §145.23(b)]	Yes ☐ No ☐
	Organization charts [40 CFR §145.23(b)]	Yes ☐ No ☐
	A schedule for issuing permits [40 CFR §145.23(f)(1)]	Yes ☐ No ☐
	A statement of the state's priorities for issuing Class VI permits and the number of permits that will be issued [40 CFR §145.23(f)(2)]	Yes ☐ No ☐
	A description of how the state will meet the new mechanical integrity testing requirements [40 CFR §145.23(f)(3)]	Yes ☐ No ☐
	A description of the state's procedures to notify owners and operators of Class I well previously permitted for geologic sequestration, or any Class V experimental technology wells that are no longer experimental but will continue to inject carbon dioxide for GS, of the requirement that they apply for and obtain a permit [40 CFR §145.23(f)(4)]	Yes ☐ No ☐
	A description of exempted aquifers, expansions of the areal extent of existing aquifer exemptions for Class II EOR/EGR transitioning to Class VI injection, and a summary of supporting data and the specific locations. [40 CFR §145.23(f)(9)]	Yes ☐ No ☐
	A description of the state's transboundary notification procedures [40 CFR §145.23(f)(13)]	Yes ☐ No ☐
	A description of procedures for documenting interstate consultations [40 CFR §145.23(f)(13)]	Yes ☐ No ☐
A revised Memorandum of Agreement with the EPA Regional Administrator as required by 40 CFR §145.25		Yes ☐ No ☐
Copies of all applicable state statutes and regulations, including those governing State administrative procedures as required by 40 CFR §145.25.22(a)(5)		Yes ☐ No ☐
The Federal/State Class VI Regulation Crosswalk		Yes ☐ No ☐

Appendix C

Example Memorandum of Agreement

MEMORANDUM OF AGREEMENT
Between
Insert Name of State
And
The United States Environmental Protection Agency Region Insert Region Number

I. General

This Memorandum of Agreement ("Agreement") establishes policies, responsibilities, and procedures pursuant to 40 CFR parts 124, 144, 145, 146, and Section 1421 of the Safe Drinking Water Act ("SDWA" or "the Act") for Insert Name of State Underground Injection Control Program ("state program") as authorized by Part C of SDWA (P.L. 93-523 as amended; 42 U.S.C. 300f *et seq.*).

This Agreement is entered into by Insert Name of State and signed by Insert Name of State Signer of Insert Name of State Agency (*e.g. Department of Environmental Protection*), (hereafter, "the state" or "the Department") with the United States Environmental Protection Agency, Region Insert Region Number, and signed by Insert Name of Regional Administrator, Regional Administrator (hereafter, "EPA" or "Regional Administrator"). This Agreement shall become effective when approved by the Regional Administrator.

A. Lead Agency Responsibilities

The lead agency, Insert Name of State Agency that receives the annual program grant, as designated by the Governor of the state, is also the lead agency to coordinate the state program. This lead agency shall coordinate the state program to facilitate communication between the EPA and the state agencies having program responsibilities. These responsibilities shall include, but not be limited to, the submission of grant applications, reporting and monitoring results, and annual report requirements. The Department is responsible for and has authority over all Class Insert All Applicable Well Classes injection wells.

B. Review and Modifications

This Agreement shall be reviewed annually as part of the annual program grant and State/EPA Agreement ("SEA") process. The annual program grant and the SEA shall be consistent with this Agreement and may not override this Agreement.

This Agreement may be modified upon the initiative of the state or the EPA. Modifications must be in writing and must be signed by the Department and the Regional Administrator. Modifications become effective when signed by both parties. Modifications may be made by revision prior to the effective date of this Agreement or subsequently by addenda attached to this Agreement and consecutively numbered, signed, and dated.

C. Conformance with Laws and Regulations

The Department shall administer the Underground Injection Control (UIC) program consistent with the state's submission for program approval, this MOA, SDWA, current federal policies and regulations, promulgated minimum requirements, priorities established as part of the annually approved state UIC grant, state and federal law, and any separate working agreements which shall be entered into with the Regional Administrator as necessary for the full administration of the UIC program.

D. Responsibilities of Parties

Each of the parties has responsibilities to assure that the UIC requirements are met. The parties agree to maintain a high level of cooperation and coordination between state and EPA staffs in a partnership to assure successful and effective administration of the UIC program. In this partnership, the Regional Administrator will provide to the Department necessary technical and policy assistance on program matters.

The Regional Administrator is responsible for keeping the Department apprised, in a timely manner, of the meaning and content of the federal guidelines, technical standards, regulations, policy decisions, directives, and any other factors which affect the UIC program.

The strategies and priorities for issuance, compliance, monitoring and enforcement of permits, and implementation of technical requirements shall be established in the state's program description, the annual SEA, or in subsequent working agreements. If requested by either party, meetings will be scheduled at reasonable intervals between the state and EPA to review specific operating procedures, resolve problems, or discuss mutual concerns involving the administration of the UIC program.

E. Sharing of Information

The Department shall promptly inform EPA of any proposed, pending, or enacted modifications to laws, regulations, or guidelines, and any judicial decisions or administrative actions, which might affect the state program and the state's authority to administer the program. The Department shall promptly inform EPA of any resource allocation changes (for example, personnel budget, equipment, etc.) which might affect the state's ability to administer the program.

Any information obtained or used by the state under its UIC program shall be available to EPA upon request without restriction. If the information has been submitted to the state under a claim of confidentiality, the state must submit that claim to EPA when providing EPA such information. Any information obtained from a state and subject to a claim of confidentiality will be treated in accordance with 40 CFR Part 2. If EPA obtains information from the state that is not claimed to be confidential, EPA may make that information available to the public without further notice.

EPA shall furnish the state the information in its files not submitted under a claim of confidentiality which the states needs to implement its approved program. EPA shall furnish to states information submitted to EPA under a claim of confidentiality which the state needs to implement its approved program subject to conditions in 40 CFR Part 2.

F. Duty to Revise Program

As stated in 40 CFR 145.32(e), within 270 days of any amendment to any regulation promulgated at 40 CFR 124, 144, 145 or 146 revising or adding any requirement respecting state UIC programs, the state shall submit notice to EPA showing that the state program meets the revised or added requirements.

G. Duration of MOA

This Agreement will remain in effect until such time as state primacy enforcement responsibility is returned to EPA by the state, or withdrawn by EPA, according to the provisions of 40 CFR Part 145.31.

H. General Provisions

Nothing in this Agreement is intended to affect any UIC or program requirement, including any standards or prohibitions established by state or local law, as long as the state or local requirements are no less stringent than or are deemed equally protective as: (1) any set forth in the UIC regulations; or (2) other requirements or prohibitions established under the SDWA or applicable regulations.

Nothing in this Agreement shall be construed to limit the authority of the EPA to take action pursuant to Sections 1421, 1422, 1424, 1425, 1426, 1431 or other sections of the SDWA.

II. Compliance Monitoring

A. General

The state shall operate a timely and effective compliance monitoring system to track compliance with program requirements. For purposes of this Agreement, the terms "compliance monitoring" or "compliance evaluation" shall refer to all efforts associated with determining compliance with UIC program requirements.

B. Compliance Schedule

The state agrees to maintain procedures to receive, evaluate, retain, and investigate all notices and reports that are required by program regulations. These procedures shall also include the necessary elements to investigate the failure of persons required to submit such notices and reports. The state shall initiate appropriate compliance actions when required information is not received or when the reports are not submitted.

C. Review of Compliance Reports

The state shall conduct a timely and substantive review of all such reports to determine compliance status. The state shall operate a tracking system to determine if: (1) the reports required by program regulations are submitted; (2) the submitted reports are complete and accurate; and (3) the program requirements are met. The reports and notices shall be evaluated for compliance status in accordance with the state compliance program and the program requirements.

D. Inspection and Surveillance

The Department agrees to have inspection and surveillance procedures to determine compliance or noncompliance with the applicable requirements of the UIC program. Survey or other methods of surveillance shall be utilized to identify persons who have not complied with program requirements. Any compilations, index, or inventory obtained for such facilities or activities shall be made available to the Regional Administrator upon request.

The Department shall conduct inspections of the facilities and activities subject to regulatory requirements. These compliance monitoring inspections shall be performed to assess compliance with all UIC program requirements and include selecting and evaluating a facility's monitoring and reporting program. These inspections shall be conducted to determine compliance or noncompliance, verify the accuracy of information submitted in reporting forms and monitoring data, and to verify the adequacy of sampling, monitoring, and other methods to provide the information.

E. Authority to Enter

The Department (and other state designees) engaged in compliance monitoring and evaluation shall have the authority to enter any site or premises subject to regulation or to review and copy the records of relevant program operations where such records are kept.

F. Admissibility

Any investigatory inspections shall be conducted and samples and other information collected in a manner to provide evidence admissible in an enforcement proceeding or in court.

III. Enforcement

A. General

The state is responsible for taking timely and appropriate enforcement action against persons in violation of program requirements, compliance schedules, technical requirements, and other UIC program requirements. This includes violations detected by state or federal inspections.

Failure by the state to initiate appropriate enforcement action against a substantive violation may be the basis for EPA's determination that the state has failed to take timely enforcement action.

B. Enforcement Mechanisms

The state shall have the mechanism to restrain immediately and effectively any person engaging in any unauthorized activity or operation, which is endangering or causing damage to public health or the environment as applicable to the program requirements. The state agency administering the program shall also have the means to sue in courts of competent jurisdiction to prohibit any threatened or continuing violation of any program requirement. Additionally, the state agency administering the program shall have the mechanism to access or sue to recover in court civil penalties and criminal remedies as established in 40 CFR 145.13.

C. EPA Enforcement

Nothing in this Agreement shall affect EPA's authority or responsibility to take enforcement actions under Sections 1423 and 1431 of SDWA.

When the states has a fully approved program, the EPA will not take enforcement actions without providing prior notice to the state and otherwise complying with sections 1423 and 1431 of SDWA.

D. Assessment of Fines

The state shall agree to assess civil penalties in amounts appropriate to the violation as required in Section 145.13(c) of the regulations.

IV. EPA Oversight

A. General

EPA shall oversee the state's administration of the UIC program on a continuing basis to assure that such administration is consistent with this MOA, the state UIC grant application, and all applicable requirements embodied in current regulations, policies, and federal law.

In addition to the specific oversight activities listed in this section, EPA may from time to time request specific information, and the state shall submit and provide access to files necessary for evaluating the Department's administration of the UIC program.

B. Immediate Reporting on Noncompliance

The Department shall immediately notify the Regional Administrator by telephone, or otherwise, of any major, imminent hazard to public health resulting from the endangerment of an underground source of drinking water of the state by well injection.

C. Program Reports

The state shall submit program reports to the Regional Administrator in accordance with Section 144.8. The reports are to be submitted quarterly using the specified 7520 reporting forms and include a narrative.

D. Inspection and Surveillance by EPA

The Regional Administrator may select facilities and activities within the state for EPA inspection.

EPA may conduct such inspections jointly with the state. The Department shall give the Regional Administrator adequate notice to participate in any compliance evaluation inspection scheduled by the state.

The Regional Administrator may also choose to conduct inspections independently of the state's schedule. In such cases, the EPA shall notify the state as least seven (7) days before any inspection that EPA determines to be necessary. However, if an emergency exists, or for some reason it is impossible to give advance notification, the Regional Administrator may waive advance notification to inspect a facility. In keeping with Section 1445(b)(2) of SDWA, the state understands not to inform the person whose property is to be entered of the pending inspection.

E. Annual Performance Evaluation

EPA shall conduct, at least annually, performance evaluations of the state program using program reports and other requested information to determine state program consistency with the program submission, SDWA applicable regulations, and applicable guidance and policies. The review will not only include a review of financial expenditures but reviews on progress towards program implementation, changes in the program description, and efforts towards progress on program elements.

EPA shall submit a summary of the evaluation findings to the state outlining the deficiencies in program performance and recommendations for improving state operations. The report also might provide guidance for the development of an upcoming grant application. The state shall have 15 working days from the date of receipt to concur with or comment on the findings and recommendations.

V. Signatures

Insert Name of State Agency

By _____
Insert Name of State Signer
Insert Title of State Signer
Date_____

U.S. Environmental Protection Agency, Region Insert Region Number

By _____
Insert Name of Regional Administrator
Regional Administrator
Date_____

Appendix D

Example Memorandum of Understanding

MEMORANDUM OF UNDERSTANDING
Between
Insert Name of Agency/Department
And
Insert Name of Agency/Department

I. PURPOSE

This Memorandum of Understanding provides an operating agreement by which ***Insert Name of Agency/Department*** and ***Insert Name of Agency/Department*** shall execute their respective responsibilities concerning regulation of Underground Injection Control (UIC) Class VI wells in the state/Commonwealth of ***Insert Name of State.***

II. BACKGROUND

On ***Insert Date***, the United States Environmental Protection Agency promulgated the UIC Geologic Sequestration Class VI Rule (***Insert FR Notice Information***) under the authority of the Safe Drinking Water Act (SDWA). The Rule defines a new class of injection well, Class VI, used for geologic sequestration of carbon dioxide beneath the lowermost formation containing an underground source of drinking water (USDW).

Currently, ***Insert Name of Agency/Department*** is the designated regulatory authority in the state/Commonwealth of ***Insert Name of State*** responsible for ***Insert Agency/Department's current regulatory responsibility for UIC*** *(e.g., protection of underground sources of drinking water through the regulation of Class I, II, IV, and V Underground Injection Control Wells).* Also currently, ***Insert Name of Agency/Department*** is the designated regulatory authority in the state/Commonwealth ***Insert Name of State*** responsible for ***Insert Agency/Department's current regulatory responsibility for UIC*** *(e.g., administering the Class II Underground Injection Control program).*

Because some of the requirements of the Class VI program may include areas of regulatory overlap (e.g., criteria for siting, area of review, corrective action), ***Insert Name of Agency/Department*** and ***Insert Name of Agency/Department*** agree that it is in their mutual interest and benefit to work cooperatively in implementing the Class VI program.

III. AUTHORITIES

This cooperative agreement is entered into with full recognition of the following regulatory mandates/authorities:

The ***Insert Name of Agency/Department*** has jurisdiction for ***Insert Regulated Activity*** (*e.g. oilfield operations, downhole operations, underground injection control, carbon capture and storage*), in accordance with ***Insert Specific State Regulation Citations Including all Relevant Definitions*** (*e.g. Chapter # of State/Territory/Tribe Environmental Code,* §____).

The ***Insert Name of Agency/Department*** has jurisdiction for ***Insert Regulated Activity*** (*e.g. permitting other classes of underground injection control wells)*, in accordance with ***Insert Specific State Regulation Citations Including all Relevant Definitions*** (*e.g. Chapter # of State/Territory/Tribe Environmental Code,* §____).

Insert any specific statutory or regulatory citations, if any, giving the respective Agencies/Departments the authority to enter into this MOU.

IV. SPECIFIC RESPONSIBILITIES

To provide an effective, streamlined, coordinated application and permitting/approval process for Class VI wells, and to reduce or eliminate duplicative administration of regulations and requirements, ***Insert Name of Agency/Department*** and ***Insert Name of Agency/Department*** hereby agree to adhere to the procedures set forth in this MOU for fulfilling the requirements of the UIC Class VI program. The procedures shall be carried out in a cooperative manner, to fulfill the objectives of ***Insert Name of Agency/Department*** and ***Insert Name of Agency/Department***, and reduce regulatory burden.

Insert Name of Agency/Department Responsibility
Insert Class VI Requirement *(e.g. site characterization, reporting, public involvement, etc.).*
Insert Agency Action
Insert Agency Action
Continue as necessary to describe the specific jurisdictions of the Agency/Department for each Class VI requirement.

Insert Name of Agency/Department Responsibility
Insert Class VI Requirement *(e.g. site characterization, reporting, public involvement, etc.).*
Insert Agency Action
Insert Agency Action
Continue as necessary to describe the specific jurisdictions of the Agency/Department for each Class VI requirement.

V. INTERAGENCY ACTIVITIES

Insert and describe any activities that require the two agencies to cooperate and describe any procedures (such as the frequency of meetings), to facilitate these activities.

VI. CLASS VI CONTACTS

Insert Name	***Insert Name***
Insert Agency	***Insert Agency***
Insert Address	***Insert Address***
Insert e-mail	***Insert e-mail***
Insert Phone Number	***Insert Phone Number***

VII. TERM OF AGREEMENT

This agreement shall be effective from the date of execution and shall remain in full force and

effect for ***Insert Term of Agreement*** unless terminated earlier by written notice from either party to the other party. This agreement may be modified, extended, or amended upon written request of either party and written concurrence of the other party.

VIII. DISPUTES

Staff from ***Insert Name of Agency/Department*** and ***Insert Name of Agency/Department*** shall meet and attempt to resolve any disputes regarding the interpretation of this MOU or disputes regarding definitions, requirements, or terms of art. Any unresolved disputes shall be elevated to Senior Management level for both Agencies.

IX. APPROVALS

By signature below, the parties to this MOU certify that the individuals listed in this document as representatives of the parties hereto are authorized to act in their respective areas for matters related to this agreement.

Signature of Authorized Representative	***Date***
Signature of Authorized Representative	***Date***
Signature of Authorized Representative	***Date***

Appendix E

Example Attorney General's Statement

Example Attorney General's Statement

I hereby certify, pursuant to my authority as (1) and in accordance with the Safe Drinking Water Act as amended, and 40 CFR 145.24(a), that in my opinion the laws of the [State/Commonwealth of (2)] [or tribal ordinances of (3)] to carry out the program set forth in the "Program Description" submitted by the (4) have been duly adopted and are enforceable. The specific authorities provided are contained in statutes or regulations that are lawfully adopted at the time this Statement is approved and signed and will be fully effective by the time the program is approved.

I. For States with No Audit Privilege and/or Immunity Laws

> Furthermore, I certify that [State/Commonwealth of (2)] has not enacted any environmental audit privilege and/or immunity laws.

II. For States with Audit Laws that do Not Apply to the State Agency Administering the Safe Drinking Water Act

> Furthermore, I certify that the environmental [audit privilege and/or immunity law] of the [State/Commonwealth of (2)] does not affect the ability of (2) to meet enforcement and information gathering requirements under the Safe Drinking Water Act because the [audit privilege and/or immunity law] does not apply to the program set forth in the "Program Description." The Safe Drinking Water Act program set forth in the "Program Description" is administered by (4); the [audit privilege and/or immunity law] does not affect programs implemented by (4), thus the program set forth in the "Program Description" is unaffected by the provisions of [State/Commonwealth of (2)] [audit privilege and/or immunity law].

III. For States with Audit Privilege and/or Immunity Laws that Worked with EPA to Satisfy Requirements for Federally Authorized, Delegated, or Approved Environmental Programs

> Furthermore, I certify that the environmental [audit privilege and/or immunity law] of the [State/Commonwealth of (2)] does not affect the ability of (2) to meet enforcement and information gathering requirements under the Safe Drinking Water Act because [State/Commonwealth of (2)] has enacted statutory revisions and/or issued a clarifying Attorney General's Statement to satisfy requirements for federally authorized, delegated, or approved environmental programs.

Seal of Office

_____
Signature

_____
Name and Title

_____
Date

(1) State Attorney General or attorney for the primacy agency if it has independent legal counsel.
(2) Name of state or commonwealth.
(3) Name of tribe.
(4) Name of primacy agency.

Appendix F

Example Class VI Permit Application Public Notification Letter

Insert Name of State/Commonwealth
PUBLIC NOTICE OF PERMIT AND HEARING
Notice Publication Date: ***Insert Notice Date***

PURPOSE OF PUBLIC NOTICE
This notice serves to state the intention of the state/Commonwealth of ***Insert Name of State/Commonwealth*** to issue an Underground Injection Control (UIC) Permit, under the authority of the Safe Drinking Water Act (SDWA) and UIC Program regulations ***Insert Regulatory Authority Citation.***

PERMIT INFORMATION
The proposed permit is for a Class VI injection well(s) that will be used to inject carbon dioxide for the purpose of geologic sequestration at ***Insert Specific Well(s) Location(s)*** *(e.g., Section 2 in Township 5, County, State*). The proposed permit, among other things, requires that the permittee monitor the injection and submit periodic reports to ***Insert Name of Permitting Agency***. On-going monitoring requirements are designed to ensure protection of underground sources of drinking water.

Permit Number: ***Insert Permit Number*** issued to:
Insert Name of Permit Holder
Insert Address of Permit Holder

PUBLIC COMMENTS
In accordance with the requirements of 40 CFR 124.10, the public is invited to comment on this draft permit by sending written comments to:

Insert Contact Name
Insert Contact Agency/Department
Insert Contact Address
Insert Contact Email

Or attending a public hearing scheduled to occur from ***Insert Hearing Start Time*** to ***Insert Hearing End Time*** on ***Insert Hearing Date*** at ***Insert Specific Hearing Location***. All comments received prior to the end of the comment period and at the public hearing will be considered in the formulation of any final permit determinations. All comments must be received by ***Insert Last Day of Comment Period***.

If no public comments are received that request a change in the Draft Permit, the ***Insert Name of Permitting Agency*** intends to issue a **Final UIC Permit** on ***Insert Permitting Date***.

FURTHER INFORMATION
Additional information may be obtained upon request by calling ***Insert Contact Name*** at ***Insert Contact Phone Number***, or by writing or sending an email to the addresses listed above. The complete permit application, draft permit, and related documents are available for review at ***Insert Where Documents May Be Viewed*** from ***Insert Times for Viewing (if applicable)***. These documents will also be available for public review at the following locations:

Insert Locations, Addresses, and Times (if applicable) of All Viewing Locations

Appendix G

Example Interstate Coordination Letter

[Today's Date]

Insert Name of UIC Class VI Program Director
Insert Return Address

To: *Insert Name of Agency Director to be Notified*

The ***Insert Name of UIC Class VI Program Agency*** has recently received a Class VI injection well permit application in which the applicant determined that the Area of Review (AoR) for the project as defined by 40 CFR 146.82(b) is predicted to cross jurisdictional boundaries, including ***Insert Name of Neighboring State/Tribe/Territory.*** While the protective requirements of Subpart H of 40 CFR 146 are designed to prevent endangerment of underground sources of drinking water, ***Insert Name of UIC Class VI Program Agency*** is informing you of this recently submitted permit application and affording you the opportunity to be involved in activities relevant to potentially permitting this Class VI injection well as required by 40 CFR 146.82(b).

The proposed Class VI well is located at:	***Insert Specific Well(s) Location(s)(e.g. Section 2 in Township 5, County, State).***
The permit applicant is:	***Insert Name of Owner/Operator.***
The applicant is located at:	***Insert Address of Owner/Operator.***
The applicant can be contacted at:	***Insert Owner/Operator phone number and/or e-mail.***
Additional information can be found by contacting:	***Insert state contact name, title, phone number and/or e-mail.***

In addition, we will be conducting a public hearing(s) on the permit application. Public hearing(s) will take place:

Insert Date, Time, and place of public hearings.

Insert Name of UIC Class VI Program Agency requests that we undertake a joint effort with ***Insert Name of Neighboring State/Tribe/Territory,*** along with other interested parties who have been contacted, to address any potential effects of this proposed Class VI injection well within your jurisdiction. These coordinated efforts will ensure the continued protection of underground sources of drinking water.

At this time, we invite you to review the contents of the Class VI injection well permit application, attend any public hearings held in the near future, and engage with us in discussions of the potential effects of this proposed well on the environment and public health of your jurisdiction throughout the permit application review and approval process, and additionally throughout the operation of the injection well.

Sincerely,

Insert Name of UIC Class VI Program Director

Appendix H

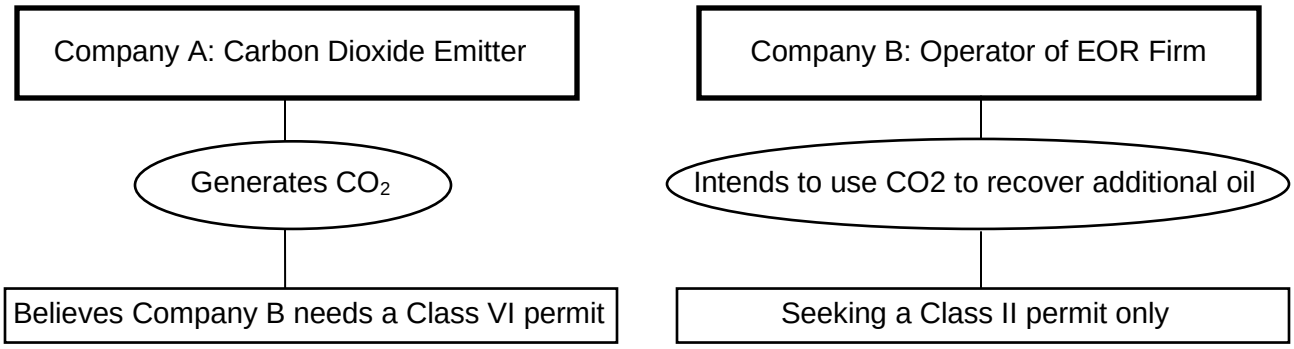
Hypothetical Class VI Primacy and Permitting Scenarios

Scenario 1

Background

Company A and Company B have a contractual agreement where Company A will produce a high quality carbon dioxide stream to be captured, compressed, and transported via pipeline to Company B's oil field. Ownership is transferred when the carbon dioxide is transported. Company B maintains that their use of carbon dioxide is entirely for EOR purposes—no carbon dioxide will be injected into areas that are not bearing commercial quantities of oil and no saline aquifer injection for disposal/sequestration. Company A is "confusing" various state agencies, namely the Primacy Agency for Class II Wells with their public statements that they will be "sequestering carbon dioxide."

In preparation for applying for a permit, Company B held meetings with various state agencies including the UIC Primacy Agency for Class II Wells and the EPA Regional Office.



Question

The primacy agency, state oil and gas division, and the EPA Region hold discussions to share information provided by Company B and to discuss what type of permit Company B will need when an UIC application is received. What issues should the agencies consider? What class of permit does Company B need?

Solution

The statements made by Company A claiming "carbon dioxide sequestration" are seemingly not relevant, since Company A is not the operator of an injection well, nor the permit applicant proposing to implement carbon dioxide injection activities. The state, or EPA regional office if the state does not have primacy, is responsible for determining at what point EOR activities transition to long-term sequestration of carbon dioxide based on the factors at 40 CFR §144.19. The owner or operator may need to provide additional documentation which supports continued use permitted as a Class II well. For

more information on the re-permitting of injection wells, refer to Section 3.3 of this manual.

Scenario 2

Primacy:
A state has primacy for Class VI wells only. The EPA regional office directly implements the UIC program of all other well classes in the state.

Permit:
An operator in the state would like to re-permit a well from Class II EOR to Class VI for long-term storage of carbon dioxide.

Questions

1. Does the state or regional UIC Program Director determine if and when the well can be re-permitted? The state may have access to production data to determine whether the oil field was no longer producing, but the EPA region may need to determine the need to plug and abandon injection wells to ensure confinement and protection of USDWs.

2. When would the EPA regional office release the operator's financial responsibility, terminate the permit, and transfer total responsibility over to the state?

Solutions

Placeholder.

Scenario 3

Scenario 1: A Class VI permit application is submitted to a state within 270 days after EPA promulgates the GS Rule. What happens now?

- No Class VI permits can be issued by states or EPA Regions
- States with SDWA § 1422 primacy can process the Class VI permit application as a Class I or V experimental technology permit
  - State can submit UIC program revision application
- States without SDWA § 1422 primacy send the application to the EPA Region which can process it as a Class I or Class V experimental technology permit
  - State can submit New UIC Program primacy application
- EPA encourages issuing permits with conditions that meet the requirements for Class VI wells to ensure that Class I and Class V wells previously used for GS can be re-permitted as Class VI wells

Scenario 2: A Class VI permit application is submitted to a state 271 days after EPA promulgates the GS Rule. What happens now?

- States with primacy for the Class VI Program:
  - Can issue Class VI permits
  - Must re-permit any GS issued Class I or Class V experimental technology permits as Class VI permits
- States with SDWA § 1422 primacy for wells classes except Class VI:
  - Send Class VI applications to the EPA Region for processing as Class VI
  - Can submit UIC program revision application
- States without SDWA § 1422 primacy:
  - Send Class VI applications to the EPA Region for processing as Class VI
  - Can submit New UIC Program primacy application
- Region re-permits any GS issued Class I or Class V experimental technology permits as Class VI permits in Class VI DI states

Scenario 4

Disclaimer

A hypothetical Class VI geologic sequestration (GS) operation is depicted below to illustrate key points and topics. This example GS situation is for the operation of a Class VI well for the injection and long-term storage of carbon dioxide and is intended to provide a hypothetical scenario similar to what a UIC Program Director may encounter during the permitting, implementation, and program evaluation processes. The hypothetical situations are for illustrative purposes only; they are not meant to provide examples of ideal procedures or preferred technologies endorsed by EPA. Site-specific circumstances will play a large role in determining the appropriate implementation of the GS Rule; therefore, the example provided here is only one of many appropriate, safe, and authorized strategies that may be used at a GS site.

In this hypothetical situation, GS activities take place at a new coal-fired 500 megawatt (power plant in a Midwestern state. The Midwestern Coal Company, the owner and operator of the power plant and the GS project, will use an integrated gasification combined cycle technique to capture the carbon dioxide and inject it on site. The target formation is a deep saline formation approximately 5,600 feet (ft) below the surface and 1,150 ft thick, one of the lowermost sandstone units in a well-researched, thick, undeformed sedimentary sequence. Previous studies have determined that the total dissolved solids (TDS) level of the target formation is approximately 200,000 milligrams per liter (mg/L), well above the 10,000 mg/L TDS cutoff value for underground sources of drinking water (USDWs). The confining unit is a shale approximately 650 ft thick and located directly above the injection zone.

With the Class VI permit application, the operator provided the UIC Program Director with maps, cross sections, and other information specified in the GS Rule and initiated a discussion regarding the proposed permit application, including whether an injection depth waiver would be necessary. The UIC Program Director confirmed with the operator that an injection depth waiver would not be required. The lowermost identified USDW is located approximately 1,300 ft below the surface. Below the proposed injection zone there is one deep saline unit; the porosity and permeability of this unit suggest it would not be a good candidate for injection. Salinity gradients reviewed by the UIC Program Director suggest that the TDS of this unit is over 200,000 mg/L, and therefore, is not a USDW.

The UIC Program Director verified that the injection zone at the well site has a porosity of 15-20% and a permeability of 25-100 millidarcies. These formation testing data and measurements of injection formation geometry indicate that the area is sufficient to receive the total anticipated volume of the carbon dioxide stream. The main confining unit is generally homogenous and has the low porosity and permeability characteristic of a shale. Laterally, it extends well beyond the initial predicted extent of the storage region within the injection zone, and analyses of its thickness and other properties indicate that it will be sufficient to contain the injected carbon dioxide.

Because the injection site is located near several towns that rely on local ground water sources, the UIC Program Director requested that the operator identify and provide data on additional confining zones. The operator provided additional geologic information indicating that interbedded shale layers in the sedimentary sequence overlying the injection zone would provide additional containment.

Several faults within the area of review (AoR) were identified during previous geologic surveys of the area. Two faults were identified that cross the confining zone. Neither fault has surface expression; both terminate in the subsurface above the confining zone, but below any USDWs and below the additional confining zones indentified by the owner or operator. The orientation of the faults is consistent with the basin history and previous stress predictions. It is unlikely that other faults crossing the confining zone went undetected. A calculation of the shale gouge ratio (based on the mineralogy and thickness of the units transected by the faults and the amount of offset along the faults) indicated that the faults were likely to be sealing (non-transmissive). The operator demonstrated during the site characterization process that the risk of leakage from faults or other fractures is very low.

With other Class VI permit application materials, the operator submitted a description of the computational model used to predict vertical and horizontal migration of the supercritical carbon dioxide plume and pressure front. The test model domain's areal extent was sufficiently large, ensuring that model boundaries did not influence results. Model inputs consisted of a combination of previously published information and data collected at the field site. The operational parameters used in the model agreed with the operational conditions predicted for the site. Based on this modeling, the AoR was determined to extend approximately 1.5 miles up-dip from the injection well, 0.5 to 1.0 miles from the injection well in other directions. The UIC Program Director reviewed the model results and determined that they met the requirements of the GS Rule.

The operator conducted a records search, and an aeromagnetic study identified and cataloged a number of abandoned wells in the AoR. However, the majority of these wells are not deep enough to penetrate the injection or confining zones, and the operator determined that none of the wells would require corrective action to prevent the movement of fluid into USDWs. One well that penetrates the injection zone was used in a previous investigation of subsurface properties; two shallow wells will be reopened and repaired to serve as dedicated monitoring wells for this project. Additionally, two more monitoring wells will be installed within the injection zone.

To meet the financial responsibility requirements of the GS Rule, the owner submitted a cost estimate to the UIC Program Director and secured two financial instruments. First, the owner established a trust fund with its local bank and set aside funds equal to the total estimated costs of corrective action, injection well plugging, and PISC and site closure. Second, to cover emergency and remedial response obligations, the owner took out an insurance policy with a national insurance company. The value of the policy was equal to the estimated costs of emergency and remedial response. The UIC Program Director evaluated and approved the financial responsibility demonstration using these two instruments.

To meet construction requirements, the operator provided details of the casing and cementing program to the UIC Program Director. The well design allowed for the use of down-hole testing devices, workover tools, and permitted continuous monitoring of the annulus space between the injection tubing and long-string casing. The operator provided a description of the materials used (casing, cement, tubing and packer), along with a determination of the compatibility of the materials with injected fluids and documentation of any standards used to determine compatibility. Information on the composition of the injectate, injection pressure and rate, down-hole temperatures, and other proposed operational data were also provided. In addition, the operator provided other well construction parameters, such as the path of circulated cement; and a determination that fluids would not move into unauthorized zones, that the screened well interval was completely within the injection zone, and that tubing could withstand anticipated injection pressures. The UIC Program Director reviewed this information and determined the proposed construction specifications for the well to be adequate.

During the drilling and construction of the injection well, the operator carried out a series of tests to verify the depth, thickness, porosity, permeability, and other characteristics of the relevant geologic units and fluids. Per the requirements in the GS Rule, tests were carried out during the drilling of the borehole, before and upon installation of the surface casing, and before and upon installation of the long-string casing. In addition, a temperature log was completed to demonstrate the mechanical integrity of the injection well, and cores of the injection and confining zones were retrieved from the injection well borehole as well as from another borehole in the AoR.

The operator notified the UIC Program Director of the logging and testing schedule. The UIC Program Director decided to visit the site to witness a portion of the testing. One day of testing had to be postponed due to scheduling difficulties with the drill rig; the operator was able to notify the UIC Program Director sufficiently in advance to be in compliance with the Rule. The operator hired an experienced log analyst to interpret the results of the logs and tests. The results of the well logs and tests were consistent with work previously done in the area and predictions from site characterization and modeling data.

A number of continuous recording devices were installed in the well to track injection pressure, injection rate, volume and temperature of the carbon dioxide stream, annulus fluid volume, and annulus pressure. The recording devices were installed in conjunction with an alarm system and down-hole shutoff mechanism.

Shortly after injection operations commenced, a low reading from a down-hole pressure gauge triggered an alarm and the automatic shutdown of the well. When the alarm was triggered, the operator immediately stopped all injection operations and notified the UIC Program Director. The operator conducted testing in and around the well, and determined that no leaks had occurred and that the mechanical integrity of the well was not compromised. Instead, the drop in annulus pressure was due to a malfunction in the injection equipment. Adjustments were made to the injection parameters to ensure that the annulus pressure would remain within the permitted range. Additionally, all

necessary equipment repairs were performed. After demonstrating mechanical integrity and notifying the UIC Program Director, the operator resumed injection at the well.

Permanent temperature and pressure gauges were installed in the injection well annulus to provide continuous down-hole monitoring. Data from these gauges are used to confirm that there are no leaks in the casing, tubing, or packer and fulfill the monitoring requirements at 40 CFR §146.89(b). The operator opted to use a temperature log one time per year to detect any fluid that may be moving through channels adjacent to the injection well bore. The UIC Program Director required that the operator run an annual casing evaluation log to check for corrosion in the long-string casing. This will be performed in addition to the quarterly corrosion monitoring described in the approved Testing and Monitoring Plan.

Permanent fiber-optic down-hole distributed temperature and pressure gauges were installed during the construction of the injection well to provide high-quality down-hole monitoring. Data will be available on a continuous basis. Temperature profiles collected along the length of the well will be used to confirm the phase of the injected carbon dioxide.

As discussed above, three monitoring wells were installed within the injection zone, and two at shallower depths. Periodic ground water samples are collected from all wells and analyzed for a suite of analytes, including carbon dioxide (%). Ground water samples from locations throughout the AoR are analyzed on a monthly or bimonthly basis (depending on the sample location). Pressure measurements are also taken periodically from these wells.

The operator decided to use time lapse surface gravity as a monitoring method to track the spread of the carbon dioxide plume. The operator originally considered using time lapse 3D seismic monitoring; however, the simple geology of the subsurface allowed for other lower-cost methods to be used. Pre-monitoring modeling using site-specific data (e.g., depth, porosity, permeability, and lithology) confirmed that gravity would be an appropriate indirect method for plume monitoring. The model indicated that a fluid with 30% carbon dioxide saturation within the reservoir could reliably be imaged using surface gravity methods. The operator arranged with local landowners to set up permanent survey stations for repeat surveys to decrease subsequent survey time and cost as well as to increase repeatability.

To meet the quarterly corrosion monitoring requirement, the operator chose to use corrosion coupons. Casing evaluation logs will also be run once a year, per the requirement of the UIC Program Director.

The operator developed a Post-Injection Site Care (PISC) and Site Closure Plan and submitted it as part of the permit application. Gravity surveys, surface monitoring, and ground water testing will continue after injection has stopped. Monitoring will continue on the same schedule for 2 years; after this time, the frequency will be reduced based on the results of the monitoring. In addition, the mechanical integrity of the abandoned injection wells will be tested prior to well plugging. Following the UIC Program Director's

approval and after a successful demonstration of non-endangerment, the monitoring wells will be closed, and the operator will develop a site closure report.

The operator developed an Emergency and Remedial Response Plan and submitted it as part of the initial permit application. After 5 years, the operator and the UIC Program Director reviewed the plan following the required AoR reevaluation. A significant amount of development has taken place in the AoR and surrounding communities, including plans for a new hospital on the edge of the AoR. The owner or operator will submit a revised Emergency and Remedial Response Plan that accounts for the new circumstances.

Appendix I

Class VI Permit Application Materials Checklist

Class VI Permit Application Materials Checklist

MATERIALS REQUIRED WITH CLASS VI PERMIT APPLICATION [40 CFR §146.82(a)]		INCLUDED?
Required Class VI Permit Information		
The following information:		Yes ☐ No ☐
	List of the permitted activities	Yes ☐ No ☐
	Facility name, mailing address, and location	Yes ☐ No ☐
	Up to four SIC/NAICS codes	Yes ☐ No ☐
	Operator's name, address, telephone number, ownership status, and status as a federal, state, private, public, or other entity	Yes ☐ No ☐
	Whether the facility is located in Indian country	Yes ☐ No ☐
	List of all permits or construction approvals, including authorization status, permit action type, and permit action date	Yes ☐ No ☐
Map showing the injection wells for which the permit is sought and the applicable area of review (AoR):		Yes ☐ No ☐
	Number, name, and location of all wells	Yes ☐ No ☐
	State or EPA approved subsurface cleanup sites	Yes ☐ No ☐
	Surface bodies of water, springs	Yes ☐ No ☐
	Surface and subsurface mines, quarries	Yes ☐ No ☐
	Water wells	Yes ☐ No ☐
	Other pertinent surface features, including structures intended for human occupancy	Yes ☐ No ☐
	Faults, known or suspected	Yes ☐ No ☐
Information on geologic structure and hydrogeologic properties of storage site and overlying formations including:		Yes ☐ No ☐
	Maps and cross-sections of AoR	Yes ☐ No ☐
	Location, orientation, and properties of known or suspected faults and fractures and a determination that they would not interfere with containment	Yes ☐ No ☐
	Data on the depth, areal extent, thickness, mineralogy, porosity, permeability, and capillary pressure of the injection and confining zone(s); including geology/facies changes based on field data which may include geologic cores, outcrop data, seismic surveys, well logs, and names and lithologic descriptions	Yes ☐ No ☐
	Geomechanical information on fractures, stress, ductility, rock strength, and in situ fluid pressures within the confining zone(s)	Yes ☐ No ☐
	Information on the seismic history, including the presence and depth of seismic sources and a determination that the seismicity would not interfere with containment	Yes ☐ No ☐
	Geologic and topographic maps and cross sections illustrating regional geology, hydrogeology, and the geologic structure of the local area	Yes ☐ No ☐
Tabulation of all wells within the AoR which penetrate the injection or confining zone(s), including a description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion		Yes ☐ No ☐
Maps and stratigraphic cross sections indicating the general vertical and lateral limits of all USDWs, water wells and springs within the AoR, their positions relative to the injection zone(s), and the direction of water movement, where known		Yes ☐ No ☐
Baseline geochemical data on subsurface formations, including all USDWs in AoR		Yes ☐ No ☐
Proposed operating data:		Yes ☐ No ☐
	Average and maximum daily rate and volume mass and total anticipated volume mass of carbon dioxide stream	Yes ☐ No ☐
	Average and maximum injection pressure	Yes ☐ No ☐
	Source of the carbon dioxide stream	Yes ☐ No ☐
	Analysis of chemical and physical characteristics of carbon dioxide stream	Yes ☐ No ☐
Proposed pre-operational formation testing program to obtain analysis of chemical and physical characteristics of injection zone and confining zone		Yes ☐ No ☐

Proposed stimulation program, a description of stimulation fluids to be used and a determination that stimulation will not interfere with containment;			Yes ☐ No ☐
Proposed procedure to outline steps necessary to conduct injection operation			Yes ☐ No ☐
Schematics or other appropriate drawings of surface and subsurface construction details of the well			Yes ☐ No ☐
Injection well construction procedures			Yes ☐ No ☐
Proposed AoR and Corrective Action Plan			Yes ☐ No ☐
Demonstration of financial responsibility			Yes ☐ No ☐
Proposed Testing and Monitoring Plan			Yes ☐ No ☐
Proposed Injection Well Plugging Plan			Yes ☐ No ☐
Proposed Post-Injection Site Care (PISC) and Site Closure Plan			Yes ☐ No ☐
Demonstration of an alternative PISC timeframe, at the UIC Program Director's discretion			Yes ☐ No ☐ NA ☐
Proposed Emergency and Remedial Response Plan			Yes ☐ No ☐
List of contacts for states, tribes, and territories within the AoR			Yes ☐ No ☐
For Class VI injection depth waivers, a supplemental report for a waiver of the requirement to inject below the lowermost USDW			Yes ☐ No ☐ NA ☐
Minimum Criteria for Siting			
Demonstration that the wells will be sited in areas with a suitable geologic system and the geologic system is comprised of:			Yes ☐ No ☐
	Injection zone of sufficient areal extent, thickness, porosity, and permeability to receive the total anticipated volume		Yes ☐ No ☐
	Confining zones free of transmissive faults or fractures and of sufficient areal extent and integrity to contain the injected carbon dioxide stream and displaced formation fluids and allow injection at proposed maximum pressures and volumes without initiating or propagating fractures in the confining zone(s)		Yes ☐ No ☐
At the UIC Program Director's discretion, identification and characterization of additional zones that will impede vertical fluid movement, demonstration that they are free of faults and fractures, allow for pressure dissipation, and provide additional opportunities for monitoring, mitigation and remediation			Yes ☐ No ☐ NA ☐
Area of Review and Corrective Action			
AoR and Corrective Action Plan must include:			Yes ☐ No ☐
	Method for delineating the AoR, including the model to be used, assumptions that will be made, and site characterization data on which model will be based		Yes ☐ No ☐
	Description of:		Yes ☐ No ☐
		Minimum fixed frequency to reevaluate the AoR	Yes ☐ No ☐
		Monitoring and operational conditions that would warrant a reevaluation of the AoR	Yes ☐ No ☐
		How monitoring and operational data will be used to inform an AoR reevaluation	Yes ☐ No ☐
		How corrective action will be conducted, including what corrective action will be performed prior to injection and what, if any, portions of the AoR will have corrective action addressed on a phased basis and how the phasing will be determined; how corrective action will be adjusted if there are changes in the AoR; and how site access will be guaranteed for future corrective action	Yes ☐ No ☐
AoR delineation, identification of all wells that require corrective action, and performance of corrective action			Yes ☐ No ☐
Predicted lateral and vertical migration of carbon dioxide plume and formation fluids by using computational modeling. The model must:			Yes ☐ No ☐
	Be based on geologic data collected to characterize the injection zone, confining zone and any additional zones; and anticipated operating data including injection pressures, rates, and total volumes		Yes ☐ No ☐
	Take into account any geologic heterogeneities, other discontinuities, data quality, and their possible impact on model predictions		Yes ☐ No ☐
	Consider potential migration through faults, fractures, and artificial penetrations		Yes ☐ No ☐

Identification of all penetrations in the AoR, including a description of each well's type, construction, date drilled, location, depth, and record of plugging and/or completion		Yes ☐ No ☐
Determination that abandoned wells in the AoR that are plugged		Yes ☐ No ☐
Corrective action demonstration		Yes ☐ No ☐
Financial Responsibility		
Demonstration of financial responsibility that meets the conditions of:		Yes ☐ No ☐
	One or more of the following qualifying instruments approved by the UIC Program Director: Trust Fund, Surety Bond, Letter of Credit, Insurance, Self Insurance, Escrow Account, or any other instrument(s) satisfactory to the UIC Program Director	Yes ☐ No ☐
	Instrument(s) sufficient to cover the cost of corrective action, injection well plugging, PISC and site closure, and emergency and remedial response	Yes ☐ No ☐
	Instrument(s) sufficient to address endangerment of USDWs	Yes ☐ No ☐
	Instrument(s) comprise protective conditions of coverage	Yes ☐ No ☐
Injection Well Construction		
The following information on casing and cementing:		Yes ☐ No ☐
	Depth to the injection zone	Yes ☐ No ☐
	Injection pressure, external pressure, internal pressure and axial loading	Yes ☐ No ☐
	Hole size	Yes ☐ No ☐
	Size and grade of all casing strings (wall thickness, external diameter, nominal weight, length, joint specification and construction material)	Yes ☐ No ☐
	Corrosiveness of carbon dioxide stream, and formation fluids	Yes ☐ No ☐
	Down-hole temperatures	Yes ☐ No ☐
	Lithology of injection and confining zones	Yes ☐ No ☐
	Type or grade of cement and cement additives	Yes ☐ No ☐
	Quantity, chemical composition, and temperature of carbon dioxide stream	Yes ☐ No ☐
Demonstration of cement not allowing fluid movement behind well bore by using logs for the use of an alternative method of cementing in cases where the cement cannot be recirculated to the surface		Yes ☐ No ☐
Evaluation of cement quality radially and identification of the location of channels		Yes ☐ No ☐
The following information on tubing and packer:		Yes ☐ No ☐
	Depth of setting	Yes ☐ No ☐
	Characteristics of carbon dioxide stream (chemical content, corrosiveness, temperature, and density) and formation fluids	Yes ☐ No ☐
	Maximum proposed injection pressure	Yes ☐ No ☐
	Maximum proposed annular pressure	Yes ☐ No ☐
	Proposed injection rate (intermittent or continuous) and volume of the carbon dioxide stream	Yes ☐ No ☐
	Size of tubing and casing	Yes ☐ No ☐
	Tubing tensile, burst, and collapse strengths	Yes ☐ No ☐
Injection Well Operation		
The owner or operator must install and use:		Yes ☐ No ☐
	Continuous recording devices to monitor: the injection pressure; the rate, volume and/or mass, and temperature of the carbon dioxide stream; and the pressure on the annulus between the tubing and the long string casing and annulus fluid volume	Yes ☐ No ☐
	Alarms and automatic surface shut-off systems or, at the discretion of the UIC Program Director, down-hole shut-off systems for onshore wells or, other mechanical devices that provide equivalent protection	Yes ☐ No ☐
	Alarms and automatic down-hole shut-off systems for wells located offshore but within state territorial waters	Yes ☐ No ☐
Testing and Monitoring		
Testing and Monitoring Plan must include:		Yes ☐ No ☐
	Analysis of carbon dioxide stream with sufficient frequency to yield data representative of its chemical and physical characteristics	Yes ☐ No ☐
	Installation and use, except during well workovers, of continuous recording devices	Yes ☐ No ☐

	Corrosion monitoring of the well materials for loss of mass, thickness, cracking, pitting, and other signs of corrosion	Yes ☐ No ☐
	Periodic monitoring of the ground water quality and geochemical changes above the confining zone(s) that may be a result of carbon dioxide movement through the confining zone(s) or additional identified zones	Yes ☐ No ☐
	Demonstration of external mechanical integrity	Yes ☐ No ☐
	If required by the UIC Program Director, a casing inspection log	Yes ☐ No ☐ NA ☐
	Pressure fall-off test	Yes ☐ No ☐
	The UIC Program Director may require surface air monitoring and/or soil gas monitoring to detect movement of carbon dioxide that could endanger a USDW	Yes ☐ No ☐ NA ☐
	Quality assurance and surveillance plan for all testing and monitoring requirements	Yes ☐ No ☐
Injection Well Plugging		
Injection Well Plugging Plan must include:		Yes ☐ No ☐
	Appropriate tests or measures for determining bottomhole reservoir pressure	Yes ☐ No ☐
	Appropriate testing methods to ensure external mechanical integrity	Yes ☐ No ☐
	Type and number of plugs	Yes ☐ No ☐
	Placement of each plug including the elevation of the top and bottom of each plug	Yes ☐ No ☐
	Type and grade and quantity of material to be used in plugging	Yes ☐ No ☐
	Method of placement of the plugs	Yes ☐ No ☐
Post-Injection Site Care and Site Closure		
PISC and Site Closure Plan must include:		Yes ☐ No ☐
	Pressure differential between pre-injection and predicted post-injection pressures in injection zone	Yes ☐ No ☐
	Predicted position of the carbon dioxide plume and associated pressure front at site closure as demonstrated in the AoR evaluation	Yes ☐ No ☐
	Description of post-injection monitoring location, methods, and proposed frequency	Yes ☐ No ☐
	Proposed schedule for submitting PISC monitoring results	Yes ☐ No ☐
Emergency and Remedial Response		
Emergency and Remedial Response Plan that describes actions the owner or operator must take to address movement of the injection or formation fluids that may cause an endangerment to a USDW during construction, operation, and PISC periods		Yes ☐ No ☐
Class VI Injection Depth Waiver		
Supplemental report for seeking a waiver of requirement to inject below lowermost USDW, including:		Yes ☐ No ☐ NA ☐
	Demonstration that injection zone is laterally continuous, is not a USDW and is not hydraulically connected to USDW, does not outcrop, and has adequate injectivity, volume, sufficient porosity, and appropriate geochemistry	Yes ☐ No ☐ NA ☐
	Demonstration that injection zone is bounded by laterally continuous, impermeable confining units above and below, and that confining units are free of transmissive faults and fractures	Yes ☐ No ☐ NA ☐
	Demonstration, using computational modeling, that USDWs above and below injection zone will not be endangered as a result of fluid movement, conducted in conjunction with the AoR determination	Yes ☐ No ☐ NA ☐
	Demonstration that well design and construction in conjunction with waiver will ensure isolation of the injectate	Yes ☐ No ☐ NA ☐
	Description of how monitoring and testing and any additional plans will be tailored to GS project	Yes ☐ No ☐ NA ☐
	Information on location of all the public water supplies affected, reasonably likely to be affected, or served by USDWs in the AoR	Yes ☐ No ☐ NA ☐

MATERIALS REQUIRED PRIOR TO WELL OPERATION [40 CFR §146.82(c)]			INCLUDED?
Required Class VI Permit Information			
Final AoR based on modeling, using data obtained during logging and testing of the well and the formations			Yes ☐ No ☐
Any relevant updates, based on data obtained during logging and testing of the well and the formation to the information on the geologic structure and hydrogeologic properties of the proposed storage site and overlying formations			Yes ☐ No ☐ NA ☐
Information on compatibility of carbon dioxide stream with fluids in injection zone(s) and minerals in both injection and confining zone(s), based on the results of formation testing program, and with the materials used to construct the well			Yes ☐ No ☐
Results of the formation testing program			Yes ☐ No ☐
Final injection well construction procedures			Yes ☐ No ☐
Status of corrective action on wells in the AoR			Yes ☐ No ☐
All available logging and testing program data on the well			Yes ☐ No ☐
Demonstration of mechanical integrity			Yes ☐ No ☐
Any updates to the proposed AoR and Corrective Action Plan, Testing and Monitoring Plan, Injection Well Plugging Plan, PISC and Site Closure Plan, or the Emergency and Remedial Response Plan, which are necessary to address new information collected during logging and testing of the well and the formation			Yes ☐ No ☐ NA ☐
Any updates to the alternative PISC timeframe demonstration, which are necessary to address new information collected during the logging and testing of the well and the formation			Yes ☐ No ☐ NA ☐
Any other information requested by the UIC Program Director			Yes ☐ No ☐ NA ☐
Logging, Sampling, and Testing Prior to Injection Well Operation			
Descriptive report prepared by a knowledgeable log analyst that includes an interpretation of the results of appropriate logs, surveys and tests to determine or verify the depth, thickness, porosity, permeability, and lithology of, and the salinity of any formation fluids in all relevant geologic formations to ensure conformance with the injection well construction requirements and to establish accurate baseline data against which future measurements may be compared. At a minimum, such logs and tests must include:			Yes ☐ No ☐
	Deviation checks during drilling on all holes constructed by drilling a pilot hole which is enlarged by reaming or another method; such checks must be at sufficiently frequent intervals to determine the location of the borehole and to ensure that vertical avenues for fluid movement in the form of diverging holes are not created during drilling		Yes ☐ No ☐
	Before and upon installation of surface casing:		Yes ☐ No ☐
		Resistivity, spontaneous potential, and caliper logs before casing is installed	Yes ☐ No ☐
		Cement bond and variable density log, and a temperature log after casing is set and cemented	Yes ☐ No ☐
	Before and upon installation of long string casing:		Yes ☐ No ☐
		Resistivity, spontaneous potential, porosity, caliper, gamma ray, fracture finder logs, and any other logs the UIC Program Director requires for the given geology	Yes ☐ No ☐
		Cement bond and variable density log, and temperature log after casing is set and cemented	Yes ☐ No ☐
	Series of tests designed to demonstrate internal and external mechanical integrity of injection wells:		Yes ☐ No ☐
		Pressure test with liquid or gas	Yes ☐ No ☐
		Tracer survey such as oxygen-activation logging	Yes ☐ No ☐
		Temperature or noise log	Yes ☐ No ☐
		Casing inspection log	Yes ☐ No ☐
		Any alternative methods that provide equivalent or better information and that are required by and/or approved of by the UIC Program Director	Yes ☐ No ☐ NA ☐

Detailed report prepared by a log analyst that includes: well log analyses (including well logs), core analyses, and formation fluid sample information		Yes ☐ No ☐
The owner or operator must record the fluid temperature, pH, conductivity, reservoir pressure, and static fluid level of the injection zone(s)		Yes ☐ No ☐
Information concerning the injection and confining zone(s)		Yes ☐ No ☐
	Fracture pressure	Yes ☐ No ☐
	Other physical and chemical characteristics of the injection and confining zone(s)	Yes ☐ No ☐
	Physical and chemical characteristics of the formation fluids in the injection zone(s)	Yes ☐ No ☐
Upon completion, but prior to operation, hydrogeologic testing of injection zone:		Yes ☐ No ☐
	Pressure fall-off test	Yes ☐ No ☐
	Pump test or injectivity tests	Yes ☐ No ☐
Schedule of testing activities submitted to the UIC Program Director 30 days prior to conducting the first test and submit any changes to the schedule 30 days prior to the next scheduled test		Yes ☐ No ☐

Appendix J

Contact Information

Users of this Primacy Application and Implementation Manual that have suggestions or feedback for improving its content are encouraged to provide comments to the EPA Office of Ground Water and Drinking Water. Please send comments to:

E-mail:
GSRuleGuidanceComments@epa.gov

Mail:
U.S. Environmental Protection Agency
Office of Ground Water and Drinking Water (4606M)
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Users may direct Class VI-related questions to state and EPA regional contacts. For a list of Regional Underground Injection Control contacts, please visit: http://water.epa.gov/type/groundwater/uic/whereyoulive.cfm.